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GEOGRAPHY.

HEATH'S DISCOVERIES IN SOUTH AMERICA. II.

BY PROF. JOHN D. PARKER, KANSAS CITY, MO.

In the April number of the REVIEW, it was my privilege to announce the recent important discoveries of Dr. Heath in South America. In the present paper, further information is given regarding those discoveries, in the form of correspondence, which is accompanied with a map of the recently explored section of the Beni River.

Dr. Heath has also sent carefully executed drawings in ink of the hieroglyphics on the rocks of the various falls of the Madeira River. They were evidently left inscribed on the rocks by a pre-historic people, and are highly interesting as studies for the antiquary. Like the hieroglyphics of Egypt they may finally be deciphered and give us some clue to the history of the ancient people who left them as vestiges of their existence. It is hoped that fac-similes of these hieroglyphics may soon be given to the public.

The following account has been compiled from the correspondence of the explorer by his brother Dr. Ivon D. Heath, of Wyandotte, Kansas:

The Doctor's letter is dated, Los Reyes, Departamento del Beni, Bolivia, April 1st, 1881. A month previous he had sent a letter, full of details of his explorations, which has not been received.

The letter of April 1st, with which was a very accurate and skillfully executed pen and ink map, twelve feet long, of the Beni River, a table of meteorological observations and an atlas of drawings of hieroglyphics from the rocks of the falls of the Madeira was sent all the way to the American Minister at La Paz

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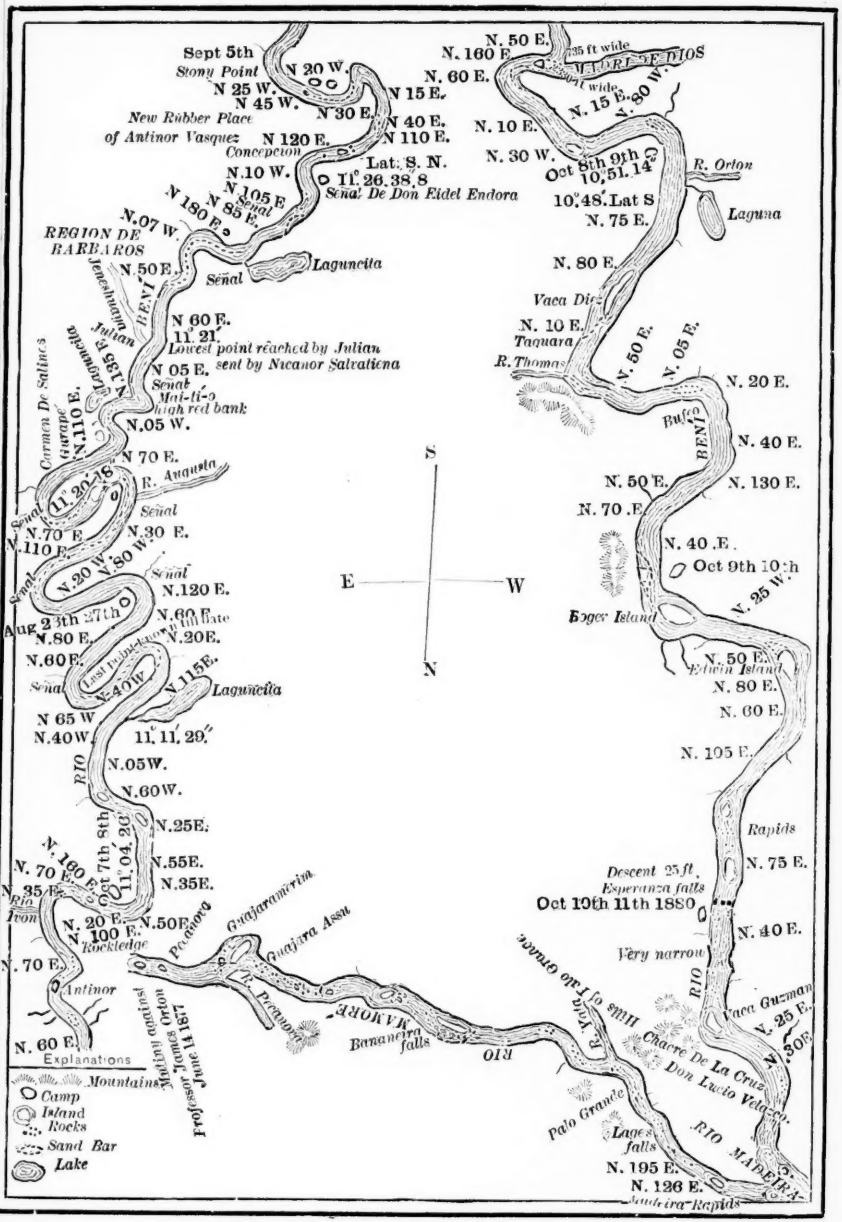

THE RECENTLY EXPLORED SECTION OF THE BENI RIVER.

by special messenger in order to insure its safe arrival. In the letter the Doctor gives much of real interest. In his descent of the known portion of the river Beni, he spent several days at Cavinas, a Catholic missionary station. This settlement is frequently visited by wandering bands of various Indian tribes, and at the time of the Doctor's visit, he met there a score of Araiina Indians who live on the Madre de Dios, nineteen days journey northwest through the forest. These Indians were entirely nude. Inquiring of them concerning the descent of the Beni, they were horrified and answered, "How is it that you think of descending the great river when we, who are men, cannot?" "How is it," asked Dr. Vaca, "that you are men and we are not?" "Because we see that you have but one wife, while the most worthless among us can support at least three."

These Indians were cannibals, and the Padre at Cavinas related to the Doctor, that on one of their visits to the mission either by indolence or lack of fortune in hunting, they were without meat and were hungry. One of the men who were lying on the ground arose, seized a nursing child by the feet, and tear ing it from its mother's arms and breast, with one whirl in the air brained it against the ground, and with the same motion tossed the little thing upon the glowing embers—when cooked, motner and all sat by and feasted.

Dr. Heath writes that Dr. Vaca, proprietor of several rubber camps, had nine of these Indians, who consented to work for him two months. Three years previous Dr. Vaca bought a boy of this tribe for an ax. The boy now understands Spanish, and serves as interpreter. "Accepting Dr. Vaca's offer, I prepared to go with him whilst he and Don Antenor Vasques proceeded 'to visit.' This they do by sitting face to face with a bottle of liquor and frequently drinking each other's health. At 3 P. M. I was ready—Dr. Vaca was not—we waited till 11 o'clock, when he awoke and we embarked. He had an iron bedstead set upon the seats of the boat and having left my mattress and carrying only a blanket, my bed on the iron slats was not the most comfortable. Dr. Vaca and a sick friend occupied the camarote (shelter of ox hide). He had a bass drum, two snare drums and two flutes, playing all the time, while beneath my bed were huddled together the nine cannibals. At 2 A. M. we stopped to see a sick rubber collector, and at 3 A. M. resumed our course down stream. This was a night never to be forgotten. I have been in many strange places, but this rather exceeded all before."

For the exploration of the unknown portion of the river, Dr. Vaca furnished the boat and one man, and Don Antenor Vasquez the other man. His boat was fifteen feet long and four feet wide, and, when loaded for the long voyage of exploration, was but three fingers width out of water.

"Arriving at the confluence of the Beni and Mamore, the ascent of the latter was very hard with but two Indians to paddle. The Mamore River is much larger than the Missouri, and resembles the latter river in its yellow water, its sand bars and in its drift wood. At the rapids of Palo Grande we unloaded the light things and carried them to the upper landing After several trips we started with the boat in which were a few heavy articles, and after hard work with long rope, we reached the whirlpool at the fall. Stepping into the water and tying a rope behind, we carefully approached the foot of the fall. The sight and roar of the rushing waters half crazed one of my men, and, having the leading rope, he pulled with all his power. I was standing deep in the water working to keep the boat near the rocky shore, and protect it from being destroyed. The strength of the excited Indian who was unaccustomed to the rapids and falls of the Mamore and Madeira, was too much for us, and the boat shooting forward with great velocity, I gave up all hope, expecting to see it dashed in pieces against the rock on which he was standing. The current carried the boat faster than the

Indian could take in the slack, and, sheering off, the boat struck the fall instead of the rocks and instantly filled, floating away our five arrobas of harina (yuca flour, or tapioca,) our paddles, plantains, yucas, rice. We also lost our last machete, and my rubber clothing. After much risk and labor the boat was tied up and bailed out. When sure of my boat, I seated myself upon a rock to rest and study our situation."

"Here we were, three men more than 300 miles from any settlement, surrounded by a dense forest, without paddles, and destitute of any wood-cutting instrument, our mainstay of food with the paddles in the center of a powerful whirlpool. Although the Mamore has been the only highway of travel and commerce for more than 300 years yet it may be days or even weeks before any boat passes. What can we do was my study as I sat in the hot sun. Shall I try to save paddles and harina? Have I physical strength sufficient to overcome the whirlpool? That I could enter and return was doubtful even without a burden. Our harina was sewed up in a rawhide and floated. Round and round went paddles and packages dancing in the waters. Fastening a rope to the shore, with the other end in hand, I quietly slipped into the water, and while being carried around swam for the center of the whirlpool. Just now my two men discovered me, and their cry of horror reached my ears above the roar of the waters. Arriving at the center I fastened the rope to the package of harina, and, hand over hand on the rope, worked my way out. The revolving of the package in the water gradually shortened the rope drawing its burden out of the center of the whirlpool. After a long rest I returned for our paddles, securing two of them—the other was irrecoverably lost. However, I found on shore a blocked-out paddle which by successive charring over fire, and scraping with a sharp stone, I finally succeeded in reducing to a serviceable shape."

"Boats generally keep near the Brazilian shore The morning after the passage of the falls of Guajaramerim we heard a human shout from the Bolivian shore. With the field glass, I discovered a Chocoba Indian who signaled us to cross over. Finding that we would not comply, the sand bar on that side was soon covered by naked savages with bows and arrows."

Arriving at Exaltacion the news of the successful exploration spread like wild-fire. New rubber forests are to those people what new gold-fields are to those of North America. The Sub-Prefect of the province sent a barge with nine powerful Mobima Indians to escort the Doctor to Santa Ana.

On his near approach to Reyes everybody turned out to receive him with ringing of bells, firing of guns and music; even the school children marched three miles from town to greet him with songs and floral offerings.

The Doctor writes that everybody talks Beni, and either goes to the new rubber forests or sends some one—that 10,000 men have already gone down the river; that last year the export of rubber from the Beni was 600 arrobas (arroba, twenty-five pounds); that this year it will be 30,000, and next year will probably amount to 250,000 arrobas.

The accompanying map of the Beni is less than one-half of the river surveyed by the Doctor. His entire map extends from Reyes to the junction of the river with the Mamore—no portion of which had ever previously been located with instruments.

The Doctor writes that he will return home this fall for the purpose of organizing an expedition to explore the Madre de Dios, a much larger river and longer than the Beni. He proposes to begin his surveys at the ancient Inca capital of Cuzco in Peru and descend the Madre de Dios from its smallest beginnings. He desires to enlist in the undertaking a competent mineralogist, a geologist and a botanist. He plans to spend at least two years in the work, and besides the

work of exploration he hopes to discover rich deposits of the precious metals, new forests of cinchona trees, valuable textile and medicinal plants, in the low lands extensive forests of rubber trees, minerals, vegetables, and animals, new to science.

Dr. Heath is a true discoverer, and will always be numbered among the explorers of South America. He is endowed with those qualities that enable him to lay his plans wisely, and to execute them with a daring that fears no evil, and an endurance that overcomes all hardships. A cloud of superstitious fear rests for centuries on one of the fairest portions of a continent, and all men pause or pass around the *terra incognita*. A guard of ten Bolivian soldiers present their bayonets at the breast of a celebrated explorer who essays to penetrate the unknown region, and refuse to go further. Dr. Heath, in a canoe with two Indians, paddles his frail bark out into the unknown river, and, bidding adieu to the world behind him, passes safely through this region so full of terror.

In the exigencies of his expedition he discloses qualities of being that are rarely discovered, and mark the true explorer. We see him exercising his profession as physician and surgeon, administering to the sick in his immediate vicinity, to furnish the means necessary to carry out his expedition. When by the unskillfulness of an attendant, his canoe is upset in a dangerous river hundreds of miles from human habitations, and everything seems to be lost, his helpless attendants climbing upon a rock beside the rushing torrent and uttering a cry of terror, we see him, not counting the cost, plunge into the whirlpool, and recover his lost paddles and supplies. When he needs a paddle and has no instrument to manufacture one, we see him charring the wood and rubbing off the carbonized portion with a stone until the rough wood is shaped into a paddle by this slow and novel process. A man endowed with such purpose, courage, endurance and ingenuity is surely fitted to be an explorer and discoverer. It was a fitting tribute that the school children of Reyes should go out to greet him, returning from his successful exploration, with songs and floral offerings.

There is only one part of the South American continent that remains to be explored—the lower portion of the Madre de Dios. Dr. Heath is now on his way to the United States, having formed the purpose of organizing an expedition to open this unknown river to civilization, and thus complete the exploration of the South American continent.

XUM

PHILOSOPHY.

A STUDY IN BIOLOGY.

BY PROF. H. A. REID.

The Psychic Calendar of Creation, by H. A. Reid, Secretary State Academy of Sciences, at Des Moines, Iowa.

To illustrate his lectures on "Evolution," "Science and the Bible," etc., approved and commended by the State Executive Committee of the Young Men's Christian Associations of Iowa.

[Calendar to be read from the bottom upward.]

SEXASENTIA	THE SPIRITUAL SENSE. HEARING SMELL SIGHT TASTE TOUCH	"Spiritual man" of the Bible. See John 3:6-7 Rom. 8:5 1 Cor. 2:14—15:46
QUINSENTIA	HEARING SMELL SIGHT TASTE TOUCH	Brute man, mammals, birds, and aerous reptiles.
QUADRISENTIA	SMELL SIGHT TASTE TOUCH	Humoid reptiles, and paleozoic sea saurians.
TRISENTIA	SIGHT TASTE TOUCH	Sauroid fishes, crustaceans, trilobites, worms.
DISENTIA	TASTE TOUCH	Protozoa, polyparia, radiates, mollusks.
UNISENTIA	TOUCH	Sensitive plants, rhizopods, pseudopods, protoplasm: the eozoon.
INSENTIA	Organic forms, but no motative sensibility.	Primordial fucoids, and vegetation generally.
AZOIC PERIOD.	No vivific structures.	*Lifeless Elements.*

This calendar is a companion-piece to the geological chart which was published in the REVIEW for July, (page 138), and the editorial note on that (page 193) applies equally to this. The order of successional types of animal life, as tabulated here, is in some measure coincident with the order in the geological chart referred to; and although following an entirely different line and method of inquiry, it arrives at the same great fact at last—the perfect harmonization of the

law and philosophy of evolution with the grand distinguishing doctrine of the Christian Bible, that there is a "natural (or carnal) man," and there is a "spiritual man."

As confirmatory of the doctrine involved in the above calendar, I will make a few citations from writers whose eminent rank both as scientists and Christian men, no one can question.

INSENTIA AND UNISENTIA.

Prof. Rolleston, in "Forms of Animal Life," says: "But it must be said that there are organisms which at one period of their life exhibit an aggregate of phenomena, such as to justify us in speaking of them as animals, whilst at another they appear to be as distinctly vegetable. * * If it should prove to be true that organisms as high in the scale as the Amœbina and Actinophryna can have their development traced back to the specialization of protoplasm within vegetable cells, it would appear to be necessary to adopt a phraseology which should speak of such creatures as being at one time plants, and at another, animals."

Prof. Sanborn Tenney, late of Williams College, in his "Elements of Zoölogy," says: "It is pretty clearly demonstrated that all animals, even the highest forms, begin their embryonic existence as mere particles or aggregated particles of protoplasm, and that out of this 'primitive indifferent tissue,' as it has been called, all the cells and tissues, and parts of the animal body are evolved. * * It must be added here, however, that at its very beginning the ovum or egg itself is something even much simpler than a cell, being merely a minute particle of fluid matter—that is, mere protoplasm."—pp. 14 and 15.

Prof. James D. Dana, of Yale College, in his "Manual of Geology," which is the standard text-book in all our higher institutions of learning, says: "The system of life began in the simple sea-plant and the lower forms of animals, and ended in man."—p. 593 "The evolution of the system of life went forward through the derivation of species from species, according to natural methods not yet clearly understood."—p. 603.

"An animal without limbs, without any sense beyond the general sense of feeling; without a circulating system; without even a stomach except such as it may extemporize when needed, and with the work of digestion, respiration and reproduction performed by the same protoplasmic material that makes up the mass of the body of the infinitesimal Rhizopod, is, as to complexity of organization, but little removed from a germ; *and such*, we have reason to believe, *was the beginning of the system of animal life.*"—*Dana's Manual* p. 595.

"The whole animal kingdom is the display of a few comprehensive structural types, the simpler forms of which appeared in early time, and the more complex came forth successively afterward. Some new organs were required in the highest manifestations of a type. But these were only developments through modification of the older, or better appliances evolved from the structure for carrying forward old processes."—*Dana*, p. 594.

Many other passages of similar import, and equally decisive, might be given. And yet, within a month past I have seen one of our leading religious newspapers, the *Christian Observer*, published at Louisville, Ky., quoting Dana's Manual of Geology, as scientific authority *against* the doctrine of evolution.

TRISENTIA AND QUADRISENTIA.

Trilobites are, so far as now known, the first animals that had eyes, although many of their species were without eyes—hence they are supposed to bridge over from the two-sensed to the three-sensed class—that is, from touch and taste to touch, taste and sight; yet all these senses must have been sluggish, feeble, and greatly generalized in this animal. Among the two-sensed animals must be classed at least one vertebrate, the Lancelet or *Amphioxus*, of which Prof. Tenney says: "It is the lowest of all the vertebrates. It is partially transparent, has no skeleton, no proper head, and only a mere longitudinal slit for the mouth, which is wholly destitute of jaws and teeth." Prof. Hæckel, from his profound studies in embryology, concludes that this creature is an intermediate form or true "connecting link" between worms and vertebrates; and there is no indication that it has any of the senses except touch and taste. And Prof. Tenney says even of our modern fishes, as to sight, "the iris neither contracts nor dilates, and the pupil is not altered, whatever be the quantity of light." As to hearing, "the ear of fishes is inclosed on every side in the bones of the head, and consists merely of a sac, representing the vestibule, and of three membranous semicircular canals." The sense of hearing in these animals is therefore merely rudimentary. And the Professor further says, "the sense of taste, of smell, and of touch, are regarded as feeble." Again, in speaking of the Dinosaurs, he says, "they are of gigantic size, and they combine in their structure reptilian, bird-like, and mammalian characteristics." They, together with the Pterodactylæ, were aerous reptiles, and were pioneers of the

QUINSENTIA,

Or five-sensed animals, which includes also all mammals and birds. And man is commonly placed in this class; but the doctrine of evolution here joins interest and evidence with the Christian Bible, and gives to man a higher rank—a sixth-sense.

SEXASENTIA.

Prof. Dana (*Manual*, p. 579,) says: "Man is linked to the past through the system of life, of which he is the last, the completing creation. But, unlike other species of that closing system of the past, (significantly the zoic era of geological history,) he, through his *spiritual* nature, is far more intimately connected with the opening future."

Prof. Allman, a high authority in zoölogy, President of the British Association of Science, in his inaugural address, Aug. 20, 1879, says: "From the first dawn of intelligence there is with every advance in organization a corresponding advance in mind. Mind as well as body is thus traveling on through higher and still higher phases; the great law of *evolution* is shaping the destiny of our

race; * * who can say that in the far-off future there may not *yet be evolved other and higher faculties.*"

Rev. Dr. Campbell, an eminent and very learned Scotch theologian and college professor, wrote in 1763 the only successful reply to the famous "argument against miracles" which had been put forth twelve years previously by the historian, David Hume; and Dr. Campbell says: "When we speak of the laws of nature, we commonly mean no more than those regarding the material world, or the laws of matter and motion with which we happen to be acquainted. Yet, those which regard spiritual beings *are as truly laws of nature* as those which concern corporeal."

Paley's "Natural Theology" has been a standard text-book in all theological seminaries for more than half a century past; and on page 231 it says: "There may be more and other senses than those which we have. There may be senses suited to the perception of the powers, properties and substance of spirits. These may belong to the higher orders of rational agents; for there is not the smallest reason for supposing that we are the highest, or that the scale of creation *stops* with us."

Prof. Winchell, the distinguished geologist of Michigan, and author of many popular works, says: "Evolution restores us to that simple conception of the relation of God to the world which is at once the primitive faith of man, the heaven-taught creed of the ancient Hebrew, and the loftiest result of modern science and philosophy."

The above citations are perhaps sufficient to indicate what is the plain logic of the law of evolution—that Man is an embryonic and transitional type, and not a closed or terminal type like the quadrumana and other lower forms. The idea was well grasped by many of the Bible writers which the logical sequences of known natural law confirm to-day, to-wit: Animal man is the larvæ of the angel; the "spiritual man" of the Bible is that transitional stage in which the angel consciousness has been more or less developed, while the larval form and mode of life still remains. And the first awakening of this angel consciousness in the man constitutes what is called "regeneration" by the churches.* The angel consciousness is a function of the spiritual or sixth-sense, which may be very dim or very bright, the same as the other senses. It furnishes its data as reliably as the other senses; but in this case as in the others, the coördinating reason must place them in their proper relation to other sense-given data, or else there will be aberrant predominance of the data furnished by the sixth sense, and thus lead to religious folly and fanaticism, the same as the excessive predominance of any other one of the senses will lead to erroneous thought and action.

* "New birth," "change of heart," "born again," or "born of the spirit," "coming out of darkness into marvelous light," etc., are all phrases used in revival and other religious meetings, which, as practical facts, mean the same thing.

RELATIONS OF SCIENCE TO SPECULATION.

BY PRINCIPAL J. W. DAWSON, LL. D.

"Do we really exist? If we do, what is the thing called life?" Such are the problems that were discussed by Principal Dawson, of Montreal, a Fellow of the Royal Society and one of the best living scientists in the study of biology, in his lecture at Association Hall, Philadelphia. It was the first of a series of gratuitous lectures on "The Relations of Natural Science to Monastic and Agnostic Speculations," given under the auspices of the Crozier Theological Seminary.

If we ask, said the lecturer, what is science in relation to nature, we have before us all that men have observed of the workings and objects of nature and the deductions therefrom. But added to this is something of another sort, sometimes called philosophy, which is really a mass of material, the growth of the thoughts of the times, and this is that troublesome commodity—modern speculation. Evolutionists need the less complain of this view, as it is the natural outgrowth of their theory. It by no means follows that our knowledge of recent discoveries equals the extent of their practical application. Take, for instance, electricity. Its application in a variety of ways is almost general, and yet there are very few things we know less about, either as to its laws or by what it is regulated. There is so much discovery that men are in danger of thinking themselves omniscient, but in reality the most of the accomplishments of science remain mysteries to mankind. The tendency to mad specialties of study, too, cause a great deal of speculation, covering the whole field to be made, from a point of view that is really restricted. Then there has sprung up a demand for sensational science just as there has sprung up a demand for sensational fiction, and if it cannot be met by facts in existence, something has to be invented, for the number of the half-starved scientific men who are trying to find the secrets of nature is by no means small. Moreover a great deal of supposed scientific truth is vague and does not mean one-half what is supposed. I don't know to what extent science is to be blamed, but not a few of those who have pushed speculation to its utmost have been literary men, and some of them had studied theology as well. An agnostic, you know, is literally one who doesn't know. As one of them has expressed the idea, "the existence of a God is unthinkable." The agnostic, while saying less than the atheist, means scientifically more, and steels himself against argument by saying it cannot be reasoned about at all. In the true sense no scientific man can be an agnostic. There are few of us, perhaps, who will refuse to accept the creed, "I exist," although there are some who might limit it, and yet our personal existence is a thing most incomprehensible, especially in regard to its beginning and its ending.

We are in a boundless space and time, with the beginning of either a mystery, so that it is scarcely possible for any one to admit his own existence with-

out arousing a vestige of the religious idea. In personal existence is involved the question whether or not the vastly complex bodily organism is the first or only the outer shell. We cannot but admit that the body is vastly more mysterious since science took it up. There is a class of philosophers who think it will simplify matters to consider the individual as a material substance with two sets of properties. If by a material substance is meant a combination of elements there is no such material in existence having the qualities of mind; if it means the whole being, the statement amounts to nothing. We must admit there is something more, and that is life. Nutrition, reproduction, sensation and voluntary motion are its functions, the last two being restricted to animal life. Herbert Spencer says life is "the continuous adjustment of internal and external relations," but that is very vague and only touches the surface. I think myself that life has the same relation to organism that force has to matter. It is some energy, whether a combination of physical energies, or the same but correlated only with organization. It is all very well to find fault with calling the living organization "a machine," but a machine has to be made by some one and for a purpose, and there is an enormous lot of theism in the idea. Who ever heard of a machine made by nobody for nothing in particular? What is the use in talking about protoplasm as the basis of life when in point of fact protoplasm depends on life as its basis? All the white of an egg is protoplasm, but life is in the embryo cell. Protoplasm may go to make feathers and flesh and tissue, and yet the life that constitutes the chick may be elsewhere. Going further, science fails to correlate the power of the human will with any physical force. It is an energy that operates only on living organs and through them on other things. Then comes the question, are we the orig nators of the world, or did it produce us, or is there a great third Being? If an atom is a vortex, as they say, what is it a vortex of? We talk very learnedly of laws of nature, but they are but the expressions of the controlled motion of things. Behind them lies an insoluble mystery.

In conclusion Mr. Dawson discussed the three theories of Herbert Spencer as to the origin of things, "self-existing," or "self-created," or "created by external agency," and raised a laugh by saying that the possibility of creation by an agency within had never occurred to Mr. Spencer. Mr. Dawson's deduction was that science is not inconsistent with the view of a superhuman power explaining the origin, design and continuance of things.—*Philadelphia Times.*

THE NATURE OF THE EXISTENCE OF MATTER.

BY E. R. KNOWLES.

Philosophers are now obliged to refer all the phenomena of the material universe to the action of a substance occupying space, which connects the planets and the earth, and which communicates light, heat, electricity and gravitation, from one body to another, and mental emotion and imaginary ideas from one

mind to another. This interstellar, and indeed, omnipresent medium is called *Etherium*, or the Ether. Most scientific men are fully convinced of its reality. It is a necessary inference from the following facts:

1. The planets influence each other and are all influenced by the sun.

2. Philosophers agree that the atmosphere does not extend more than eighty miles above the earth's surface.

3. Heat, light, electricity, magnetism, and gravitation, operate in an exhausted receiver, as well as elsewhere.

4. One mind sometimes influences another independently of ordinary sensation or muscular motion, without contact or perceptible connection.

Says Prof. Tyndall, "The domain in which this motion of light is carried on is entirely beyond the reach of our senses. The waves of light require a medium for their formation and propagation, but we cannot see, or feel, or taste, or smell this medium. How, then, has its existence been established? By showing that by the assumption of this wonderful intangible *ether* all the phenomena of optics are accounted for with a fullness and clearness, and conclusiveness which leave no desire of the intellect unfulfilled. When the law of gravitation first suggested itself to the mind of Newton, what did he do? He set himself to examine whether it accounted for all the facts. He determined the courses of the planets; he calculated the rapidity of the moon's fall toward the earth; he considered the precession of the equinoxes, the ebb and flow of the tides, and found all explained by the law of gravitation. He, therefore, regarded this law as established, and the verdict of science subsequently confirmed his conclusion.

On similar, and, if possible, on stronger grounds, we found our belief in the existence of the universal ether. It explains facts far more various and complicated than those on which Newton based his law. If a single phenomenon could be pointed out which the ether is proved incompetent to explain, we should have to give it up; but no such phenomenon has ever been pointed out. It is, therefore, at least as certain that space is filled with a medium by means of which suns and stars diffuse their radiant power, as that it is traversed by that force which holds, not only our planetary system, but the immeasurable heaven's themselves in its grasp." To other kinds of ethereal action are referable muscular motion, sensation, and all other known phenomena, except the as yet inexplicable phenomena of consciousness and volition.

Says Prof. J. Stanley Grimes: "Light cannot penetrate boards and stone walls, but magnetic force can do so; for a magnet affects iron filings through such obstacles, almost as if there was nothing in the way; and so also does gravitation. It is plain that if we could perceive through the medium of this magnetic force instead of light, we could see through boards and walls as easily as the magnet operates through them; for the magnet operates in the dark just as well as in the light. We must conclude, therefore, from the great number of facts which we have upon this subject, that there is a motion of etherium, different from light, by means of which the force of gravitation is communicated; and another modification of ethereal motion, by means of which magnetism penetrates

through opaque bodies. It, therefore, requires no stretch of the imagination to admit a modification of ethereal force which affects the brain and its organs, and produces Consciousness and Clairvoyance in a subject who is, by the process of ethereal induction, brought into communication with it.

If we analyze a sunbeam, we can demonstrate that besides light and heat it contains another kind or motion of etherium, different from light and heat, which produces powerful chemical effects; and yet we have no senses given to us by which to enable us to perceive by its means, though it may sometimes abnormally induct us, and produce clairvoyant perception.

It seems to me that there cannot be a doubt in the mind of a philosopher who examines this subject carefully, that there is a peculiar form or modification of ethereal force, which has, with some propriety been denominated *animal magnetism*, and which is concerned in producing all the phenomena of animal life, and all the wonders of Etheropathy and Mesmerism. We seem forced to this conclusion as the only one which will account for facts which we are not able to controvert."

It is well known that orators often exercise a so-called magnetic influence over their hearers. It has been proved that mesmeric susceptibility is owing neither to the imagination, nor the credulity, nor the nervousness of the subject, and that when a subject is in a state of etheropathic sympathy produced by induction ideas can be communicated from the mind of the operator to that of the subject, and the subject made to act by the silent, unexpressed will of the operator, without any indication being given to the subject by the word, look, or deed of any one as to what the operator has in mind. These last mentioned facts have led some philosophers to suppose this ether of which light, heat, electricity and magnetism are manifestations, to be homogeneous with, or at least intimately connected with, that immaterial, simple substance, the soul.

The idea that the will of man can direct ethereal action in such a manner as to produce etheropathy, or mesmerism, is perfectly consistent with the nature of the will.

In the case of the electric eel, we have an instance of the will directing electricity in such a manner as to paralyze the limbs of animals at a great distance, and even to produce death. If, then, the electric eel can instinctively direct by its will *one* modification of ethereal action, it is reasonable to suppose that the will of man can direct *another*.

Absolutely nothing is *known* for certain concerning the real nature of substance.

In view of the facts herein already adduced, it is reasonable, and indeed the only way whereby to account for certain incontrovertible facts, to refer all things to immaterial substance, and to refer matter, as well as light, electricity, etc., to the simple, uncompounded, immaterial substance, called the *ether*. All the difficulties with which philosophers now meet in explaining various phenomena by the action of the ether arise from their not explaining the very existence of matter by ethereal action. "That which truly is, or essence," is the proper meaning of

substance. *Substance* is "the ultimate point in analyzing the complex idea of any object." *Accident* denotes all those ideas which the analysis excludes as not belonging to the mere being or nature of the object."

The substance of all matter is the *ether.* The accidents of any material thing are its peculiar modifications of ethereal action. The *ether* acts in space directed and compelled in its action by the Divine Will. They are:

1. Simple ethereal action, as electricity and light.
2. Combined modifications of ethereal action, constituting matter.

The *ether* exists independently of the Creator, but while this substance of all matter exists independently, the accidents of material things are constantly sustained by the Divine Will in accordance with fixed and permanent laws. This theory explains the phenomena of matter by the action of the *ether;* but it teaches neither that the ultimate reason of all movement is a force primitively communicated at creation, a force which is everywhere, present in all bodies but differently limited; not that any such force is inherent in the *ether;* nor yet that force is transmitted through the ether; but I hold that the Divine Will constantly sustains by sympathetic induction the modifications of ethereal action, both simple and combined.

At any point in space such action of the *ether* directed by the Divine Will *is ever going on*, that an object there situated has no real existence *there*, whether any one is there to perceive it or not, its real existence being a combination of certain modifications of ethereal action; and the same object is presented to every spirit which happens to be brought into communication with that point in space, this presentation being governed by fixed laws, and any one who has already perceived a particular object knows that upon going again to the place where it is, the same object, or combination of modifications of ethereal action will be communicated to his soul by means of the same ether as a medium and by certain other modifications, and combinations of modifications of ethereal action.

Our perception, therefore, of real ideas or material objects is the result of the action of the Divine Will on our minds through the medium of the *ether*, and the Eternal Spirit constantly sustains and presents these real ideas for the contemplation of "created spirits," but they have a real existence in space out of the minds which perceive them.

This theory does not merge the creature in the Creator; and does not make God the agent or power in everything that is done, and thereby lead us to the same point with Hume, viz: that the mind is but a mere series of impressions, and that we can have no knowledge of it.

XUM

GEOLOGY.

THE CARBONIFEROUS ROCKS OF SOUTHEAST KANSAS.

BY G. C. BROADHEAD.

At the eastern boundary of Miami county, Kansas, we find the high-lands to vary from 950 to 1050 feet above the sea, the valleys being 875 to 910. In the Neosho Valley the elevation at Neosho Falls is about 1000 feet. Up to this place and a little farther, we pass over a gently sloping country. It then rises more rapidly, being 1150 feet on higher land. West of the Verdigris the country rises more rapidly and is more rugged.

In Osage county coal is profitably mined, which, according to Prof. Mudge, belongs to the Lower Coal-measures. The Lower Coal-measures pass southwardly along the Neosho Valley, which seems to occupy a trough in these measures, but eastwardly, including Miami county, the northern half of Anderson and the county northwardly, only the upper series are exposed, connecting with similar measures in Missouri.

West of the Verdigris River the Upper Coal-measures also extend, but soon disappear beneath the "Permian." The main productive Coal-measures of southeast Kansas lie south of Miami county. Passing from Paola southwestwardly to Greenwood county, we find only a thin coal-seam occasionally mined, but with no profitable result. Near the line of Greenwood and Woodson counties a seam of less than a foot in thickness is sometimes mined. This is the most western exposure of coal belonging to the Carboniferous formation. In the western part of Woodson and in Greenwood counties the lowest exposed rock is fifty feet of coarse sandstone which I have referred to the Lower Coal-measures, but only a few fragmentary remains of plants were found in it. Above this are thin limestone beds full of *Fusulina cylindrica* and nearly 200 feet more of sandstone, with other limestone beds above, containing well known Carboniferous fossils, including *Fusulina cylindrica* and *Chætetes*. The step now is more rapid to the "Permian."

Entering the State near the line of Cowley and Chautauqua counties, we find ourselves upon a long dividing ridge extending and well-defined for seventy miles northwardly.

This ridge is much higher than the country east or west of it, and is known in southern Kansas as the "Flint Hills," on account of numerous fragments of flint lying strewn over the surface. It includes the Permian rocks of Kansas and might appropriately be termed the "Permian Mountains." Its elevation above the sea is 1560 feet near Greenfield, in northeast part of Cowley county 1600 feet; and the highest point near the corner of Greenwood, Elk and Butler about

1700 feet. This is the highest ground east of Arkansas and Walnut Valleys. On the west side of this ridge the descent is gentle and scarcely perceptible, being 390 feet in twenty-five miles to the Arkansas Valley. On the east the descent is more abrupt, the ridge presenting rugged walls of limestone separated by shaly slopes, and the hills descend 350 feet in four miles, or 390 feet in six miles, and in some places the descent is still more abrupt. From the main ridge sharp spurs extend off from six to ten miles eastwardly. From the peculiarly rough character of the eastern face of this ridge good wagon passes are often distant as much as ten miles.

The approaches to this ridge from Fall River Valley is by a succession of terraces or plateaus of Upper Carboniferous rocks. At Twin Falls we are on a lower terrace elevated about 1000 feet above the sea. The second terrace is reached six miles southwestwardly at 1160 to 1180 feet. This terrace occupies a large area of the eastern part of Greenwood county with most of Elk. The elevation of the next terrace is about 1300 feet above the sea and it reaches to the foot hills of the Permian and the slopes above blend with the Permain. This will include altogether about 500 feet of Upper Coal-measure rocks in this part of Kansas which lie below the Permo-carboniferous. These beds are mainly shaly sandstones with occasional limestone beds and as far as observed contain one coal bed of seven inches with two beds of bituminous shale, and one other coal seam of five inches thickness appears just beneath the Permian. The Permian or Permo-carboniferous of the "Flint Hills" include a total of about 500 feet thickness. The following section I have condensed from several taken within twenty miles.

1. Sixty-two feet including chert layers with thin beds of shaly drab-colored limestone; the highest rocks seen in "Flint ridges," observed *Bryozoa* with *Athyris subtilita*, *Productus costatus* and *Hemipronites crenistria*.

2. Ninety feet mostly thin limestone layers chiefly disintegrating on exposure.

3. Seven feet bed of porous chert resting on limestone. *Pinna peracuta* found everywhere. A *Phillipsia* was also obtained.

4. Eighty-five feet chiefly drab shales with some thin layers of limestone and red shale near lower part. Fossils are very abundant and can be picked up in a finely preserved state, and include *Fistulipora(?)*, *Productus Nebrascensis*, *P. semireticulatus*, *Meekella striaticostata*, *Chonetes graculifera*, *Terebratula bovidens*, *Athyris subtilita*, *Yoldia subscitula*, *Schizodus Rossicus*, *Myalina perattenuata*, *Hemipronites crenistria*, *Aviculopima Americana*, and other known Upper Carboniferous fossils.

5. Five feet of bluish drab and sometimes buff limestone containing *Eumicrotis Hawni*, *Mayalina perattenuata*, *Aviculopecten occidentalis*. [This bed is easily recognized wherever seen.]

6. Ten feet red and green shales.

7. Fifty-three feet beds shale, with some beds of limestone very good for building purposes.

8. Twenty-eight feet limestone abounding in *Fusulina cylindrica;* the middle layers contain blue chert full of *Fusulinæ* showing the structure very finely.

9. Twenty-eight feet of sandstone.

10. Four feet gray limestone containing *Productus semireticulatus, Allorisma granosa, A. subcuneata, Pinna peracuta, Nautilus capax,* etc.

The last bed I regard as the base of the Permian.

Other fossils obtained at the several localities include *Allorisma subelegans, A. Topekaensis, Macrodon* —, *Nautilus occidentalis, Murchisonia* —. Although these fossils seem at home in the *Permian,* I have obtained them also, with scarcely an exception, from known Upper Coal-measure rocks of Missouri; in fact most of them have been obtained from the rocks of Kansas City.

The limestones of the Permian have been extensively quarried in Kansas from the southern to the northern part of the State, and many tons sent off to the market. Some of the rock quarried is too soft for valuable structures, but many very excellent quarries have been opened.

From levels taken on corresponding beds wide apart, we find there is a regular dip, westwardly, of not less than twenty-five feet per mile. Assuming this to be correct we may be safe in saying that there are 1500 feet total thickness of Permian beds in southern Kansas. In the counties of Butler, Cowley, Elk and Greenwood, it is the *newest* rock below the *Quaternary.* No other rocks of later formation than the Permian are found here. The Permian of Kansas rests *conformably* on the *Coal-measures,* and there is no decided line of separation between the two. Certain strata can be grouped together as can certain other strata of other formations.

The only marked difference is this: Passing a certain horizon in the ascending series, we find the rocks to be all of a drab, buff or cream color and the limestones more impure and breaking with a rough fracture, and when vertically jointed the angle more nearly approaches a right angle, whereas the Coal-measure limestones are generally more acutely jointed and the blocks are regular rhomboids.

The group of the Permian Mountains forms an interesting study; the strata are easily traced and the scenery afforded is very fine and the view extensive.

The above is an abstract of a more detailed paper.—*American Journal of Science.*

From the nodule of chromite in the interior of the meteorite iron of Cohahuila, Mexico, Dr. J. Lawrence Smith, of Louisville, Kentucky, has obtained, on analysis of it, 62.61 of oxide of chromium and 33.82 of ferrous oxide.

XUM

METEOROLOGY.

TABLES OF METEOROLOGICAL OBSERVATIONS.

The following tables of Meteorological Observations have been furnished us by Dr. E. R. Heath, the explorer of the Beni River:

MONTH.	YEAR.	RAINFALL.		FAHRENHEIT THERMOMETER.				PLACE.
		Quantity.	No. Days	High't Max.	Low't Min.	MEAN OF Maximum.	MEAN OF Minimum.	
January	1879	15.000	23	97°	70°	87.996°	72.666°	San Antonio
"	1880	9.231	14	94	72	87.$\frac{2}{31}$	77.$\frac{27}{31}$	Reyes
February	1879	10.245	22	94	70	88.$\frac{5}{28}$	72.571	San Antonio
"	1880	5.576	9	94	69	87.000	72.100	Reyes
March	1879	16.412	24	94	70	87.$\frac{28}{31}$	71.$\frac{28}{31}$	San Antonio
"	1880	6.145	9	92	70	84.$\frac{12}{31}$	76.$\frac{16}{31}$	Reyes
April	1879	11.339	21	94	68	88.440	72 100	San Antonio
"	1880	.765	2	86	65	79.$\frac{18}{29}$	72.$\frac{11}{29}$	Reyes
May	1878	3.800	11	97	58	86.600	69.600	San Antonio
"	1879	1.040	9	94	59	88.$\frac{5}{31}$	68.$\frac{30}{31}$	"
"	1880	5.145	4	88	64	81.$\frac{1}{9}$	71.$\frac{1}{9}$	Reyes
June	1878	.436	6	97	65	87.500	67 $\frac{1}{5}$	San Antonio
"	1879	2.315	5	93	62	90.$\frac{1}{30}$	69.$\frac{7}{30}$	"
"	1880	3.888	9	88	54	80.$\frac{26}{31}$	69.$\frac{2}{30}$	Reyes
July	1878	.010	1	96	57	91.$\frac{1}{6}$	66 $\frac{1}{5}$	San Antonio
" to 21st.	1879	.000	0	93	60	91.500	64.$\frac{17}{30}$	"
* " 21st to 31st inc	1879	.000	0	94	65	90 000	68.$\frac{5}{9}$	Cachuelas
"	1880	.000	0	90	61	86.$\frac{7}{31}$	70.$\frac{18}{31}$	Reyes
August	1878	.535	2	98	59	92.$\frac{4}{31}$	68.500	San Antonio
† "	1879	1.002	2	98	52	90.$\frac{16}{31}$	66.$\frac{21}{31}$	Cachuelas
"	1880	1.730	3		58			Reyes
Sept'ber	1878	1.395	5	101	60	90.$\frac{1}{3}$	68.500	San Antonio
‡ "	1879	4.100	5	96	55	87.$\frac{7}{13}$	69.$\frac{2}{13}$	R. Mamore and Sta. Ana to Reyes.
"	1880	.905	4					Reyes
October	1878	8.265	16	99	67	90.$\frac{1}{3}$	69.$\frac{26}{31}$	San Antonio
"	1879	7.654	11	95	65	86.$\frac{12}{31}$	71.$\frac{26}{31}$	Reyes
"	1880	2.140	5					"
Novem'r	1878	9.145	13	94	68	89.$\frac{1}{9}$	67.$\frac{4}{9}$	San Antonio
"	1879	7.275	9	94	68	88.$\frac{29}{30}$	74.$\frac{28}{30}$	Reyes
"	1880	6.530	12					"
Decem'r	1878	11.301	21	94	66	88.$\frac{23}{30}$	72.$\frac{4}{15}$	San Antonio
"	1879	10.769	13	94	72	86.$\frac{15}{31}$	75.$\frac{5}{31}$	Reyes
"	1880	1.280	3					

* San Antonio to Girao. † Girao to Itenez (Rio). ‡ R. Itenez to Exaltacion, Sta. Ana and Reyes.

MONTH.	YEAR.	BAROMETERS.		THERMOMETER FAHRENHEIT attached to the Mercurial Barometer.	LOCALITY.
		Aneroid.	Mercurial.		
January	1880	1662.7415′	28.9301″	80.2092°	Reyes
February	1879		29.0820	81.2678	San Antonio
"	1880	1592.7145	29.0777	78.2077	Reyes
March	1879		29.1733	80.6290	San Antonio
"	1880	1538.1442	29.1147	79.7820	Reyes
April	1879		29.2028	80.3333	San Antonio
"	1880	1455.0516	29.2404	76.3244	Reyes
May	1879	1122.7419	29.2603	78.6370	San Antonio
"	1880	1512.6875	29.1916	74.4250	Reyes
June	1879	1098.9582	29.3089	79.2000	San Antonio
"	1880	1419.5416	29.2254	74.4916	Reyes
July	1879	1084.3600	29.4671	77.5000	San Antonio
21st to 31st.	1879	1152.8124	29.3707	77.6041	San Antonio to Girao
"	1880	1468.7499	29.1957	77.3548	Reyes
August	1879	1211.3325	29.4090	76.7500	Girao to R. Itenez
* "	1880	1409.5739	29.1320	78.0282	Reyes
September	1879	1278.7500	29.3510	83.2857	R. Itenez, Sta. Ana to Reyes.
† "	1880	1374.9333	29.2260	75.5930	Reyes
October	1879	1507.7750	29.1514	78.5200	"
‡ "	1880	1360.2342	29.1724	78.2445	"
November	1879	1631.1600	29.0636	81.8666	"
§ "	1880	1644 6979	29.0789	79.7193	"
December	1879	1626.4100	29.0457	78.6774	"
"	1880	1860.9649	29.0794	79.5085	"

Lat. 8° 48′ 14″ South, (Selfridge,) San Antonio.

Lat. 14° 16′ 34.5″ South, (E. R. Heath,) Reyes.

Long. 63° 55′ 05″ West of R, (Selfridge,) 64°38′ 08″ (Keller,) San Antonio.

Long. 68° 22′ 52″ West of R, (E. R. Heath,) Reyes.

Var. Mag., Reyes, 9° 12′ E. (Nov. 2, 1879), San Antonio, 5° 56′ E. (E. R. Heath).

A mysterious star, called the Pilgrim, which was observed in 945, 1264 and 1572, is expected by astronomers to appear before long. It was described in 1572 as brighter than Jupiter, and "such was its brilliancy that persons were able to detect it at noon in a clear sky, and at night when the sky was so overcast as to hide all other stars." If it appears it will probably be visible for several weeks in the constellation of Cassiopeia.

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* Aneroid observations made on the Beni River between Lats. 14° 15′ 56″ and 10° 20′ S.

† Aneroid observations made on the Beni and Mamore Rivers between Lats. 10° 20′ and 13° 44′ 04″ S.

‡ Aneroid observation to October 11, inclusive.

§ Aneroid observations from October 11, inclusive.

XUM

ASTRONOMY.

ASTRONOMICAL NOTES FOR SEPTEMBER, 1881.

BY W. W. ALEXANDER, KANSAS CITY, MO.

THE SUN.

Date.	Right Ascension.	Declination N.	M. T. Meridian Passage.
1st,	10h, 43m.	8° 4′	11h. 59m. 44.07° a. m.
5th,	11 58	6 36	11 58 26.02 "
10th,	11 16	4 42	11 56 43.54 "
15th,	11 34	2 47	11 54 58.16 "
20th,	10 52	0 51	11 53 12.59 "
25th,	12 10	S. 1 05	11 51 29.19 "
30th,	12 28	3 02	11 49 50.09 "

On the 22nd at 4 P. M. its center will pass the celestial equator and autumn commence. The apparent diameter is slowly increasing.

THE MOON.

Date.	Right Ascension.	Declination South.	Apparent Diameter.
1 st,	16h. 39m.	22° 23′	31′ 43.2″
5th,	20 40	14 05	33 17.8
10th,	1 18	N. 12 28	32 17.2
15th,	5 49	22 08	30 03.0
20th,	9 50	7 45	29 37.0
25th,	13 42	S. 14 18	30 37.8
30th,	18 24	21 13	32 02.4

On the 15th at 5 A. M. it will be 51′ south of Mars. The best time for telescopic observations will be from the 12th to the 16th, and from the 28th to the end of the month.

MERCURY.

Date.	Right Ascension.	Declination North.	M. T. of Meridian Passage.
1st,	10h. 51m.	9° 8′	oh. 7m. p. m.
5th,	11 18	6 2	0 18 "
10th,	11 50	2 6	0 31 "
15th,	12 20	S. 1 45	0 42 "
20th,	12 49	5 27	0 51 "
25th,	13 17	8 56	0 58 "
30th,	13 43	12 10	1 05 "

It will be to the east of the Sun during the entire month. The most favorable time for seeing it will be about the 29th when it will set in 1h after the sun, at a point 10° south of west. On the 24th it is 3° 25′ south of the moon.

VENUS.

Date.	Right Ascension.	Declination North.	M. T. of Meridian Passage.
1st,	8h. 05m.	19° 32′	9h. 23m. a. m.
5th,	8 25	18 45	9 26 "
10th,	8 49	17 34	9 30 "
15th,	9 13	16 12	9 34 "
20th,	9 36	14 37	9 38 "
25th,	10 00	12 52	9 42 "
30th,	10 23	10 58	9 46 "

She now occupies the position of morning star rising about 2h. 20m. before the sun. The *verse sine* of the illuminated portion, divided by the apparent diameter 13.4″ = .884.

MARS.

Date.	Right Ascension.	Declination North.	M. T. of Meridian Passage.
1st,	5h. 7m.	22° 21′	6h. 22m. a. m.
5th,	5 17	22 36	6 16 "
10th,	5 29	22 53	6 08 "
15th,	5 41	23 06	6 01 "
20th,	5 52	23 16	5 52 "
25th,	6 03	23 24	5 43 "
30th,	6 13	23 30	5 33 "

It will be in the constellation Taurus until the 15th, then enter Gemini, where it will remain to the end of the month. The apparent diameter is slowly increasing, the mean being 9″ for the month.

JUPITER.

Date.	Right Ascension.	Declination North.	M. T. of Meridian Passage.
1st,	3h. 35m.	18° 08′	4h. 49m. a. m.
5th,	3 36	18 10	4 33 "
10th,	3 37	18 11	4 14 "
15th,	3 37	18 11	3 55 "
20th,	3 37	18 09	3 35 "
25th,	3 36	18 06	3 14 "
30th,	3 35	18 02	2 54 "

On the 14th it will be stationary *i. e.* its right ascension does not change for a short time. Its diameter is about 43″

The four satellites present the following phenomena in Kansas City Mean Solar time. The abbreviations used are, In. ingress; Eg. egress; Dis. disappearance; Re. reappearance; Ec. eclipse; Oc. occultation; Tr. transit of the satellite; Sh. transit of the shadow.

XUM

DATE.			
3d,	11:27 p. m.	Io,	Sh. In.
4th,	12:47 a. m.	Io,	Tr. In.
	1:39 a. m.	Io,	Sh. Eg.
	2:58 a. m.	Io,	Tr. Eg.
5th,	12:06 a. m.	Io,	Oc. Re.
	9:26 p. m.	Io,	Tr. Eg.
7th,	12:22 a. m.	Europa,	Sh. In.
	2:58 a. m.	Europa,	Sh. Eg.
	3:00 a. m.	Europa,	Tr. In.
	10:34 p. m.	Ganymede,	Sh. Eg.
8th,	2:13 p. m.	Ganymede,	Tr. In.
	3:32 a. m.	Ganymede,	Tr. Eg.
	10:03 p. m.	Europa,	Ec. Re.
	10:07 p. m.	Europa,	Oc. Dis.
9th,	12:40 a. m.	Europa,	Oc. Re.
10th,	1:21 a. m.	Io,	Sh. In.
	2:38 a. m.	Io,	Sh. Eg.
	10:30 p. m.	Io,	Ec. Dis.
12th,	1:56 a. m.	Io,	Oc. Re.
	9:05 p. m.	Io,	Tr. In.
	10:02 p. m.	Io.	Sh. Eg.
	11:19 p. m.	Io,	Tr. Eg.
14th,	2:57 a. m.	Europa,	Sh. In.
15th,	12:44 a. m.	Ganymede,	Sh. In.
	2:35 a. m.	Ganymede,	Sh. Eg.
	10:07 p. m.	Europa,	Ec. Dis.
	3:17 a. m.	Europa,	Oc. Re.
17th,	9:15 p. m.	Europa,	Tr. Eg.

DATE.			
18th,	3:15 a. m.	Io,	Sh. In.
	4:27 a. m.	Io,	Tr. In.
19th,	12:24 a. m.	Io,	Ec. Dis.
	3:45 a. m.	Io,	Oc. Re.
	9:44 p. m.	Io,	Sh. In.
	10:54 p. m.	Io,	Tr. In.
	11:56 p. m.	Io,	Sh. Eg.
	1:05 a. m.	Io,	Tr. Eg.
20th,	10:12 p. m.	Io,	Oc. Re.
23d,	12:43 a. m.	Europa,	Ec. Dis.
24th,	9:06 p. m.	Europa,	Tr. In.
	9:28 p. m.	Europa,	Sh. Eg.
	11:38 p. m.	Europa,	Tr. Eg.
25th,	8:11 p. m.	Ganymede,	Ec. Re.
	11:13 p. m.	Ganymede,	Oc. Dis.
26th,	12:25 a. m.	Ganymede,	Oc. Re.
	2:18 a. m.	Io,	Ec. Dis.
	11:38 p. m.	Io,	Sh. In.
27th,	12:42 a. m.	Io,	Tr. In.
	1:50 a. m.	Io,	Sh. Eg.
	2:53 a. m.	Io,	Tr. Eg.
	8:47 p. m.	Io,	Ec. Dis.
	12:00 a. m.	Io,	Oc. Re.
28th,	7:09 p. m.	Io,	Tr. In.
	8:19 p. m.	Io,	Sh. Eg.
	9:20 p. m.	Io,	Tr. Eg.
30th,	3:19 a. m.	Europa,	Ec. Dis.

SATURN.

Date.	Right Ascension.	Declination North.	M. T. of Meridian Passage.
1st,	2h. 42m.	13° 8′	3h. 56m. a. m.
15th,	2 41	12 58	2 59 "
30th,	2 39	12 42	1 58 "

The apparent elements of the ring on 17th are diameter of outer Major Axis 44.06″, Minor Axis 15.04″, inclination of northern semi-minor axis to circle of declination from north to east 307′, elevation of the earth above the plane of the ring 19° 57.8′, elevation of the sun 18° 44.3′, earth's longitude from Saturn counted on the plane of ring from the rings ascending node equator 94° 04.2′ on ecliptic 51° 19.6′.

URANUS.

Date.	Right Ascension.	Declination North.	M. T. of Meridian Passage.
1st,	11h. 02m.	7° 2′	oh. 17m. p. m.
30th,	11 08	6 20	10 26 a. m.

NEPTUNE.

Date.	Right Ascension.	Declination North.	M. T. of Meridian Passage.
1st,	2h. 58m.	15° 4′	4h. 11m. a. m.
30th,	2 56	14 55	2 16 "

PHENOMENA.

On the 3d at 1 a. m., conjunction of Uranus and Mercury. Mercury north 57′; near the sun.

On the 6th at 10 a. m., conjunction of Uranus and the Sun.

On the 12th at 00.17 a. m., conjunction of Saturn and the Moon. Saturn south 5° 17′.

On the 13th at 00.16 a. m., conjunction of Jupiter and the Moon. Jupiter south 2° 38′.

On the 15th at 7:29 a. m., conjunction of Mars and the Moon. Mars north 0° 51′.

On the 25th at 7:00 p. m., conjunction of Venus and Regulus. Venus north 0° 12′.

THE NEW COMET.

The comet discovered by Professor Schaeberle, of Ann Arbor, July 13th (Comet C, 1881), is now visible through an opera glass, and will soon be to the naked eye. Its identity is still uncertain; most probably there is no record of its previous appearance. It is expected to be one of the most conspicuous comets of the century. Under date of July 22nd, Mr. Henry M. Parkhust says: "It may not equal Gould's comet in brightness, for the nucleus may not be brighter than the north star, and yet it is not uncommon for the brightness of a comet after passing its perihelion to much exceed that computed from its appearance before its perihelion passage. It has already developed a tail as marked as that of Donati's comet an equal time before its perihelion passage, and it would now be visible to the naked eye but for the presence of the moon, although perhaps not distinguishable from a star. Up to the 15th of August the comet will be visible in the morning in a direct line between Aldebaran and Theta Ursa Major, being now midway between them. On August 15th it will be near Theta, with its tail pointing toward the north star. It will then cease to be visible in the morning, not rising until after twilight begins. It now sets at the same time with the sun, but will gradually set later, so that it will become visible in the evening before it is entirely lost in the morning. On August 19th it will be near Nu Ursa Major, with

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its tail pointing toward and perhaps reaching Gould's comet, then visible only in the telescope in the Little Dipper. On August 25th it will be in the constellation Coma Berenices, the tail probably passing over or near Arcturus. Early in September the comet and its tail will both pass below our horizon, still as bright as Coggia's comet at its best."

Prof. Swift says, under the same date: "Of course it is impossible yet to predict with certainty, but it would seem as if it would eclipse the glories of Comet B" (Gould's Comet).—*Scientific American.*

MINERALOGY.

IRON SAND.

On the shores of New Zealand, and many other localities, there are vast quantities of iron sand, which might be profitably utilized. In the last edition of Simmonds' "Waste Products," (pp. 413-419), some detailed information on the New Zealand iron sands will be found.

One of the American contributions for the Electrical Exhibition at Paris is a modification of Mr. Edison's magnetic separator for the treatment of iron sand. The iron sand on the south shore of Long Island contains 26 per cent of the finest iron known. Innumerable attempts have been made to separate the sand, and magnetic plates have been used before, but with no success, on account of the presence of what is known as titaniferous iron—a substance which spoils iron. Edison discovered that titanic iron was less magnetic than the pure iron particles, and constructed his separator with that end in view.

The sand falls a distance of four feet in a thin stream from a slit in a V shaped box holding about a ton. Under this box is a receiver divided into two compartments, the dividing partition being placed nearly under the slit in the sand reservoir and parallel to it. If no magnet is brought into play the sand all falls into one side of the box: but when a powerful magnet is brought near enough to act upon the falling showers, the pure iron particles are deflected in their fall and fly on the other side of the partition. The particles of titanic iron are not attracted equally with the iron, and are not deflected sufficiently to fall into the compartment with the pure iron.

A company has been formed in America for the extraction of iron from Long Island sand, and is now at work with its first machine at Quoque, near Moriches, on the Great South Bay. This machine, which is managed by one boy, keeps six men and two carts busy bringing sand for the hopper. It treats 100 tons of sand a day, producing about 20 tons of pure iron, costing a dollar a ton to produce, and selling for six dollars.—*Journal of Applied Science.*

INCREASING USE OF ASBESTOS.

Persons of a certain age can all remember when at different dates in the past, the newspapers contained rather exciting statements of fact or rumor respecting new practical illustrations of asbestos, by which important branches of industry were to be speedily revolutionized. These statements generally seemed invested with some degree of probability in view or in recollection of known facts. Several ancient writers speak of cloths made of the strange mineral, which were used for various purposes. Dead bodies, for example, were wrapped in asbestos cloth, that in burning, the ashes of the person might be kept separate from the ashes of the wood. Perpetual lamps to be suspended in tombs and in temples were furnished with asbestos wicks—which burned without being consumed. Not only nets but garments for ordinary wear were made of it, and they were not washed when dirty, but were cleaned with fire. In an age somewhat nearer our own Emperor Charles V is recorded to have had a complete table set of the unconsumable material. In Corsica various articles of household use are made of it in union with a clay found in the island. In parts of Italy asbestos lace is valued, while the asbestos girdles of the Pyrenees, the asbestos caps of Siberia, etc., are curiosities inquired for and regarded with some interest. Asbestos garments for firemen were the brief sensation of Paris some years ago.

Of late years, in Germany, asbestos seems to have been gradually meeting with practical application in a variety of ways and on quite an extensive scale in some of them. The great capacity in resisting heat and disturbing forces from without possessed by the material recommends it for use in connection with the steam engine. Great technical difficulties had to be overcome in preparing or adapting it for the purposes of practical utility, but these difficulties appear to have been completely conquered, and we learn that the stuffing box of a 300 horse-power winding engine working day and night in connection with a mine in Hernsdorf, near Waldenburg, was packed with asbestos on the 15th of November, 1877, and at the end of seven months was found to be literally unaffected by use, the material looking exactly as on the day it was put in. In the water-works at Dresden, on a railway in Silesia and in various other parts of Germany, the same material has been on trial now during some years in connection with steam engines where its peculiar qualities suggest its use, with the most successful results. Neither the greatest pressure nor exposure to the greatest heat overcomes its power of resistance or affects it in any way. It is found not to need the close watching that is necessary with other materials, and it has in some positions the great advantage that its slippery property almost dispenses with the use of grease, requiring it in the smallest quantity. In a word, the Germans appear to be captivated by the thing, and to anticipate its extension to purposes not yet thought of, as well as its continued use in those cases wherein it has been tried.

The Germans admit that the Americans were the first to think seriously of the wide employment of asbestos in the field of industry, though they are of opinion that they have not gone on as they began. Asbestos, it may be worth while to

add, belongs mineralogically to the hornblend group; but it occurs in many varieties of structure and class. It is found in many countries, and may be discovered in many more. In Europe it abounds in Switzerland, in Silesia, in Moravia, in Italy and elsewhere. It is, however, more abundant in North America than in any other part of the world. In some countries it is called stone flax and mountain flax.—*Journal of Applied Science.*

NICKEL IN NEW CALEDONIA.

The discovery, some years ago, in the French penal colony of New Caledonia of ore deposits rich in nickel, has led to important results in the industrial production of this metal. Up to that time, the most important nickel-producing mine in the world was the famous Gap Mine in Lancaster county, Pa., which has been successfully worked for a number of years by Mr. Joseph Wharton, whose American Nickel Works, at Camden, N. J., produced all the nickel used in the United States, and even supplied to some extent the foreign demand. The ore of the Gap mine is what is known to mineralogists as a nickeliferous *phyrrotine*, being substantially a sulphide of iron carrying about 3 per cent of nickel, and is extremely difficult to work.

The deposits of New Caledonia yield an ore, which, if it is not a new mineral, is nevertheless quite new in its metallurgical relations. It is a hydrous silicate of magnesia and nickel, carrying about 10 per cent of nickel. It is of an apple or pear green color, and has been called *garnierite* (or *naumeite*). This ore is said to be quite free from traces of sulphur, arsenic, iron and copper, and if cobalt is present, it is there in very minute quantities.

Since the discovery of these valuable deposits, immense quantities of the ore have been shipped to France and England. Its freedom from the above named deleterious impurities, and from bismuth, lead and antimony, which accompany the German nickel ores, renders its working comparatively easy; and this fact, in connection with the abundance and richness of the ore, has created quite as great a revolution in the industrial production of nickel as the discovery of the Australian tin deposits did for that metal. The price of nickel abroad, it is said, has fallen to some 3 or 4 shillings per pound, from 16 shillings or thereabouts.

Nickel has been found to be applicable to many and varied uses in the arts, and all that is required to assure it a permanent position of widely extended usefulness in the industries, is the assurance that abundant supplies of the metal are available, and that it will be produced at a cheap and uniform price. On this account, therefore, much importance attaches itself to the statements which represent the New Caledonia nickel deposits to be very extensive.—*Journal of Applied Science.*

MICA.

While speculation in mica mining is rife, there are few mines that prove paying investments. Nothing is more common than mica deposits in some form, but nothing is more uncommon than to find a mine which will yield a good profitable return for the money invested. Nature has been very capricious regarding this mineral, and out of some two hundred mines in this country, it is not probable that over half a dozen approach anywhere near "Bonanzas." Even suppose the mine to yield mica in sufficient quantity, there are several features in the business which tend to diminish profits. In the first place, of the mica taken from the mine about five per cent is worthless; opaque mica is not a merchantable article and must be thrown aside. Afterward when the mica is cut into required sizes there occurs a shrinkage of from 40 to 60 per cent. The mica trade hinges on the stove business, for in stove doors does mica find its chief use. It has a very limited use for scientific purposes, electrical apparatus, compass cards, lanters, etc. It is employed for battle lanterns on war ships, for the concussions incident to naval engagements would soon shatter glass. All these uses, however, are insignificant compared with its application to heating apparatus.

Were not the production of mica limited to Nature's stores which she very sparingly doles out, there would have undoubtedly been new uses discovered for the mineral long before this. New Hampshire and North Carolina furnish most of the mica required, though deposits exist over a wide stretch of territory, and the mineral has been found as far west as the Rockies. The Indians were acquainted with it, and used it for ornaments to adorn their persons, and for mirrors to reflect their dusky charms. On opening a mine in North Carolina some years ago, a copper instrument supposed to be at least three hundred years old was found. There has been much small mica thrown on the market in recent years, and prices of this kind have declined, but large mica, being scarce, maintains its price. The number of farmers in Maine, New Hampshire and Vermont who have discovered mica deposits on their estates, and who have seen prospective wealth therefrom, is legion, but the number who have really profited by their discoveries is very small.—*Manufacturers' Gazette.*

The California lode is down to a depth of 1300 feet, the deepest mine in Colorado. The 1300-foot station has been established, from which levels are driving both ways—east and west. The mid-dirt from this depth is yielding five and a half ounces gold per cord. This practically demonstrates the fact that deep mining will pay. The smelting ore from the 1300-foot levels is fully up to the former standard of that ore mined in the upper workings of the vein.

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HISTORICAL NOTES.

EARLY NOTICES OF THE MISSOURI RIVER AND INDIANS.

(SECOND PAPER.)

BY JOHN P. JONES, KEYTESVILLE, MISSOURI.

In the year 1712, Louis the XIV, conveyed the commercial privileges of Louisiana to Anthony Crozat, "Secretary of the household crown and revenue," and in describing the boundaries of the grant, attempted to change the names of the three greatest rivers in the province, as follows:

"We, by these presents, signed by our hand have appointed, and do appoint the said Sieur Crozat to carry on a trade in all the lands possessed by us, and bounded by New Mexico, and by the English of Carolina, all the ports, rivers, havens, and particularly the river St. Louis, heretofore called the *Mississippi*, together with the river St. Philip, heretofore called the *Missouri*, and St. Gerome, heretofore called Oubache (Ohio), with all the countries, territories, lakes, etc."

The name St. Louis, as applied to the Mississippi, was in use for some years, but it is a matter for congratulation that the Indian names of these three great rivers have survived all attempts of the white man to change them. Surely no Missourian will regret that our noble river is not called St. Philip, even though a Bourbon prince should have desired to perpetuate in that manner the name of "our dearly beloved cousin."

As the great resources of the Mississippi Valley became known, the English began to turn their attention in that direction. Some of their writers claim that an English vessel ascended the Mississippi as early as the year 1648, but of this there is no evidence. Others assert that expeditions from the English colonies on the Atlantic coast traversed the valley prior to the year 1700. Individual parties may have crossed the mountains and sailed down the Ohio prior to that date, but there is no written evidence of any organized expedition from the coast into the valley between the date of its occupation by La Salle and the advent of Iberville at the mouth of the Mississippi.

The first recorded visit of Englishmen to the valley by the way of the Mississippi was in the year 1699.

In that year Bienville while making a survey of the river, about eighteen miles below where New Orleans now stands, was surprised to see two vessels bearing English colors, making their way up stream. They proved to be under the command of Captain Barr, and had come on a voyage of discovery. Upon the representation of Bienville that the country was already in possession of the

French, the English captain returned to the gulf. The promoter of this expedition was Daniel Coxe, a gentleman of wealth, living at London, who sent several exploring parties into the valley afterward, and from the reports received from them, prepared and published a volume,* describing the country. Of the Missouri he says: "The great Yellow River to the west is so named because it is yellow and so muddy that, though the Meschacebe is very clear where they meet, and so many great rivers of crystalline waters below mix with the Meschacebe, yet it discolors them all even into the sea. When you are up this river sixty or seventy miles you meet with two branches, the lesser, though large, proceeds from the south and is called the river of the Osages, from a numerous people who have sixteen or eighteen towns seated thereon, especially near its mixing with the Yellow River. The other, which is the main branch, comes from the northwest. The Yellow is called the River of the Massorites, from a great nation inhabiting many towns near its junction with the River of the Osages."

In another place he says: "It will be one great conveniency of this country if it ever comes to be settled, that there is an easy communication there with the South Sea which lies between America and China, by the north branch of the great Yellow River, by the natives called the River of the Massorites, which hath a course of 500 miles, navigable to its heads or springs, and which proceeds from a ridge of hills, passable by a horse, foot or wagon in less than half a day, somewhat north of New Mexico. On the other side are rivers, which run into a great lake, that empties itself by another great navigable river into the South Sea." This was written nearly one hundred years before the expedition of Lewis and Clarke by which it was proven that the Missouri and Columbia have their sources within a few miles of each other and might be quoted as additional evidence that the Indians of the valley visited the Pacific coast.

By the peace of Utrecht, in 1713, England obtained from France large concessions of territory in America, but Louisiana remained untouched, though many of the leading spirits in the colonies urged that the valley of the Mississippi be included in the acquisitions of the mother country. William Penn, Governor Spottswood, of Virginia, and the assembly of New York, addressed the queen on the subject but without result. During the war preceding this peace, some of the northern tribes influenced by emissaries of the English, besieged Detroit with the intention of burning it. The Jesuit fathers stationed there, summoned their Indian allies from the chase, and by the middle of May the besiegers were surrounded by Hurons, Pottawatomies, Illinois, Osages and Missouris, who hastened to the relief of their priests, so widespread was the influence of the missionaries in the west. They came in war parties, and camping near the post sent in a delegation encouraging those within, and saying to the priests, "Father, behold thy children compass thee around."† They soon compelled the surrender of the besiegers, putting to death those who bore arms, and distributing the remainder as slaves among the confederates.

* A description of the English province of Carolina, by the Spaniards, called Florida, and by the French, La Louisiane; by Daniel Coxe. Esq., London, 1726. † Charlevoix's History of New France, Vol. II.

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Among the early writers on the Louisiana country none are more interesting than Lieutenant Dumont, who spent twenty years in the colony. In the first volume of his Historical Memoirs he says, "I am going to give here the list of all the names of the savage nations, inhabiting this country. The asterisk which will be found before some of their names, denotes that we are actually at war with the nations thus marked." He then gives a list of the Indian tribes, and among others the Missouris are marked with an asterisk. Following the list he says, "The savages which on this list are not noted by an asterisk, are reckoned among our friends, but mark this, however, that though they may be friends, it is always wisest not to trust one's self to them fully."

Another French annalist, M. LePage DuPratz, whose history has proven a mine of information for later writers says, in writing of the Missouri River: "The Missouri takes its source at 800 leagues as well as can be ascertained from the place where it empties in the St. Louis. Its waters are muddy, troubled and charged with niter, and it is because of these waters that the St. Louis is so muddy to the sea. The reason of the color is that the former flows over sand and firm ground, while the latter takes its course across fertile lands where one sees but few rocks, and although the Missouri comes from a mountain toward New Mexico we must remember that all the country through which it passes is for the most part rich soil. This river not having been ascended by the French but a short distance about three hundred leagues at most, the branches which empty in it are only known to the natives. It makes no difference what names they bear at present, being in a country little frequented. The best known of these is the Osage, which takes its name from a nation which dwells on its banks; it empties in the Missouri River near its mouth. The largest known river which falls into the Missouri is the Canzes. It has nearly two hundred leagues course through a beautiful country. From what I have been able to learn of the course of the Missouri, it flows from its source to the Canzes from west to east, there it makes a great elbow which ends in the neighborhood of the Missouris, where it retakes its course toward the southeast, there to lose its name and waters in the St. Louis."

This extract is from the pen of one of the best informed men in the colony at the time it was written, and shows that the information possessed by those, who from their position would be presumed to be well informed concerning the Missouri was very meager, even as late as the middle of the last century. The same writer continues, "The waters of this river of the Missouri, are always thick and muddy and it seems that its source is not far from the place where, on the map of M. de Lisle, they make Fort Dauphin, or the sea of the west." This sea of the west was an imaginary lake that M. de Lisle located in the northwest part of this map of Louisiana from information derived from Indians. It is possible they were attempting to describe Salt Lake.

Under date of November 17th, 1750, Father Louis Vivier wrote from Kaskaskia as follows:* "Mississippi signifies Great River in the Illinois language.

* Lettres Edifantes, Vol. VII.

It appears to have usurped this denomination over the Missouri. Before its junction with this river the Mississippi is not considerable, it has very little current while on the contrary the Missouri is larger, deeper, more rapid, and takes its source from a greater distance. Several large rivers flow into the Mississippi, but it seems the Missouri alone furnishes more water than all the others together; here is the proof, the water of the greater part, I might say of all the rivers that the Mississippi receives, is but moderately good, that of some positively unwholesome, that of the Mississippi even before its alliance with the Missouri, is not of the best. On the contrary, the water of the Missouri is the best water in the world. Now, that of the Mississippi after its junction with the Missouri, to the sea, becomes excellent. Therefore, the water of the Missouri must be dominant."

How any one acquainted with the waters of the two rivers could write in this manner, I cannot understand, and I, therefore, conclude that the father derived his information from others as to the excellency of the water of the Missouri.

At another place Father Vivier says: "Among the nations of the Missouri some appear to have a disposition particularly inclined to receive the gospel, among them the Panismahas. One of the missionaries of whom I have spoken wrote one day to a Frenchman who traded with these savages, and he begged him in his letter to baptize the dying children. The chief of the village perceiving this letter said to the Frenchman 'what is the news?' 'Nothing,' he responded. 'What!' said the savage, 'because we are red men can we not know the news?' 'It is the Black Gown,'* answered the Frenchman, 'who writes to me, and recommends that I baptize the dying children to send them to the Great Spirit.' The chief perfectly satisfied said to him: 'Do not be uneasy, I will take upon myself the task of informing you always, when any child shall be in danger.'"

On the 3rd day of November, 1762, the King of France ceded to Spain all the country known as Louisiana. In February, 1763, a treaty of peace was signed at Paris between the Kings of Spain and France on one side and the King of Great Britain on the other, by which all of the province of Louisiana east of the Mississippi, except New Orleans, was ceded to the latter power. After the promulgation of this treaty the French authorities were loyally willing to surrender the country to the English, but the Indians showed a disposition to resist them.

The Illinois, Missouri and Osage tribes, in a council held at Fort Chartres, in October, 1765, breathed nothing but war. The chief of the Kaskaskias addressed the English agent, who had come to receive possession of the fort, as follows:

"Go hence and tell your chief that the Illinois and our brethern will make war upon you if you come upon our lands. Away, away, and tell your chief that these lands are ours, no one can claim them, not even the other red men. Why will you come here, you do not know us, we have never seen you. Tell

* The Jesuit Missionaries were called Black Gowns, by nearly all the western tribes.

your chief to stay on his own land as we do on ours. Adieu! Go and never return, or our wild warriors will make you fall."

"We," said the chiefs of the Missouris and Osages, "think like our brethren, the Illinois and we will aid them to keep their lands. Why, O Englishmen, do you not remain on your lands as the red men do on theirs. These lands are ours, we hold them from our fathers. They lived upon them and now they are ours. No one can claim them of us, therefore, depart. Begone! begone, and tell your chief the red men will have no Englishmen here. Begone, never to return."*

Such was the frenzy the Indians had worked themselves up to, that the English agent was in personal danger and owed his safety to the circumspection of St. Ange†, who remained as the respresentative of the French. Ross, the English representative was obliged to descend to New Orleans, leaving the French still temporarily in possession of the Illinois district.

In 1766, Matthew Clarkson a merchant of Philadelphia made a journey overland to Fort Chartres on the Mississippi, and in a diary in which he recorded incidents of the trip he mentions the Osages as follows: December 23rd, 1766, a party of Osages came to the fort, Tawanahet, the chief. Mons. Jeredot,‡ the elder who has been a trader for many years among the Indians informed me that the Osages live on a river of the same name which falls into the Missouri from the southward. That they have about —— men capable of bearing arms. He says that they have a feast which they generally celebrate about the month of March, when they bake a large corn cake of about three or four feet in diameter, and of two or three inches in thickness. This is cut into pieces from the center to the circumference, and the principal chief or warrior arises and advances to the cake, where he declares his valor and recounts his noble actions. If he is not contradicted or no one has aught to allege against him he takes a piece of cake and distributes it among the boys of the nation, repeating to them his noble exploits and exhorting them to imitate them. Another then approaches, and in the same manner recounts his achievements and proceeds as before. Should any attempt to take of the cake to whose character there is the least exception, he is stigmatized and set aside as a poltroon."

Feasts were frequently observed among nearly all the Indian tribes, and generally had some peculiar significance. Some of the southern tribes had a special feast for every month, among the number there was one called the Green Corn Feast, which occurred in May. Among some of the tribes on the Missouri

* The noted warrior, Pontiac, was the chief instigator of this opposition to the English. He was present at this council with four hundred warriors from the lakes, and declared that if the English were permitted to take possession of the fort he would destroy it.

† A Canadian officer, prominent in the early history of the Mississippi Valley. He was at Fort Orleans, in 1724, but retired to Kaskaskia before the massacre at that post. After the surrender of the eastern part of Louisiana to the English, he, with most of the French, removed from Fort Chartres and Kaskaskia, to Laclede's new post of St. Louis, where his name is perpetuated in a street called St. Ange Ave.

‡ Jean Baptiste Girardeau, or as spelled by himself, Girardot. The ancestor of the family whose name is perpetuated in the name of a town and county in our State.

River there was a feast celebrated at which the maidens participated, and which resembled the feast of the Osages, except that in the former case it was the character of the maidens for chastity that underwent the ordeal of a challenge. The knowledge of the Louisiana country possessed by the English in the last century was very limited indeed, and an examination of their histories proves that they depended upon French sources for their data. Thos. Jeffreys published at London, in 1760, a large volume entitled "The Natural and Civil History of the French Dominions in North and South America," but all he says of the Missouris and Osages is taken from Charlevoix and has already been given.

Bowen's Geography published in London, in 1760, says in describing the boundaries of Louisiana "Neither are those on the northwest less uncertain. The Missouri, a great river which gives name to a vast tract of land, flows from that point into the Mississippi." In enumerating the Indian tribes in Louisiana, the author does not mention the Missouris or Osages, but locates them on his map. In 1770, Captain Phillip Pittman published at London, a work entitled "The Present State of European Settlements on the Mississippi," in which he says: "The source of the Missouri River is unknown. The French traders go betwixt three and four hundred leagues up to traffic with the Indians, who inhabit near its banks. From the confluence with the Mississippi to its source, it is supposed to be eight hundred leagues."

MEDICINE AND HYGIENE.

TREATMENT OF HAY-FEVER.

Dr. Hermann Hager, who has observed a case of catarrh with subsequent asthmatic trouble and loss of appetite, which closely resembled the hay-fever of England and the United States, thought of trying his *catarrh-pills* (I.), prepared after the following manner:

℞	Quinidiæ Sulphatis	10.0 gm.
	Tragacanthæ	4.0 "
	Althæa rad.	1.0 "
	Gentian rad	8.0 "
	Glycerin	7.0 "
	Acid. hydrochloric	7.0 "

M. Make 200 pills. Take 3 every two hours.

(Comp. also *New. Rem.*, 1880, 243; 1881, 254.)

The condition of the patient improved in the course of the first day, and on the second day the patient was well. Six months afterward the attack again occurred, but yielded readily to the same treatment.

Hager thinks that hay-fever is caused more probably by the dust or spores of fungi, than by the pollen of phænogamous plants.—*Pharm. Centralhalle*, No. 18.

COOKERY FOR INVALIDS.

The following, from a recent English journal, contains some hints which form a suggestive appendix to former articles that have appeared in our columns on this important subject:—

Give the distasteful food the semblance of something that is particularly palatable to the patient, and your efforts will be rewarded by your soon beholding him eating with an appetite. For instance, you are bound to give mince, and equally bound not to give pastry. Your patient, however, is fond of pastry. What you must then do is this: You must make a *vol-au-vent* case, and fill it with minced chicken or lamb. Then, though your patient may not eat a single mouthful of the crust, the look of the whole thing calls up the pleasurable feelings associated with the *vol-au-vent*, in lieu of the feeling of disgust excited by a dish of mince. On this day you will find that he enjoys his meal; on another occasion you can surround the mince with a wall of mashed potatoes or boiled rice. Again, you may send up your mince in the guise of a "cottager's pie." This, as every one knows, is just a layer of minced meat placed at the bottom of a small pie dish, covered with a three-inch layer of potatoes, put in the oven and nicely browned. Yet, again, you may put the mince into rissoles, or roll it up inside batter, or, failing all these, can make three-cornered sandwiches with it. In this last case the mince should be of chicken, and, instead of buttering both pieces of the bread, you might spread the faintest *soupçon* of potted ham on one of them.

In catering for such an invalid as we have in view, our aim is to get him to take a stipulated amount of meat per diem. The doctor has ordered him so many ounces a day, to be given in any form (save the solid) in which he can be induced to swallow it. As long, then, as this quantity gets taken, our object is secured. We may give it, if we like, through the medium of soup, or through that of meat jellies. It is quite possible, therefore, to let two, or even three, days in the week pass without mince in any one of its Protean shapes being present. We can make chicken panada, and put as much as is equivalent to the specified number of ounces into a plate of soup; or, again, we can make some strong ox-tail jelly, and administer a couple of glasses to him; and then, when we have given the due allowance of meat, we are able to include in that day's *menu* things which are more appetizing, though less nourishing, than the mince. We can give him a souffle flavored with vanilla, served in a smoking tin, with a snowy white napkin around it. Charlotte russe, macaroni with sweet sauces, roast apples (to be eaten with baked milky rice pudding), stewed pears covered with cream, and innumerable other puddings can be given with great benefit, since,

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by causing your invalid to derive pleasure from some portion at least of his meal, you prevent him from regarding all eating as distasteful.

But, above all, it must be remembered that the way in which things are served is the most important element in the matter. The trays should be covered with the freshest of cloths, and even be rendered bright by a vase of flowers. You should never set a plate before an invalid containing the exact quantity of meat, fish, or pudding you want him to eat. If you do, he will be sure to leave half, with the complaint that he has no appetite. He should always have everything served on small dishes, and should be allowed to assist himself. His vegetables and sauces should never be heaped on his plate, but should come up in tiny vegetable dishes and pretty sauce-boats. Above all, he should never be told beforehand what he may expect, so that his meals have all the charm of a surprise. In short, an invalid's meals should be so managed that he should look forward to them with pleasure as to a break in the day's monotony, instead of turning from them with disgust, as from some disagreeable ordeal to be undergone with all the resolution he can muster.—*Boston Journal of Chemistry.*

ALCOHOL IN THE ARMY.

A careful study of the effect of the "spirit ration" in the British army was lately made by a writer in the *British Medical Journal.* His conclusions were as follows:

(1.) Spirits are not an absolute necessity in the field.

(2.) Given before or during a march, or work of any description, they are nearly always calculated to harm.

(3.) The only case in which exception need be made to the above rule is when men are near the end of a long and fatiguing march, which it is necessary should be accomplished. Then the issue of a spirit ration may probably supply the necessary stimulus for completing the work; but it must be on the condition that no further work shall be demanded until after a sufficient period of repose.

(4.) The issue of a ration at night, when work is done, may be useful as a sedative, and in inducing calm and refreshing sleep.

(5.) Under any of these circumstances, the ration ought not to exceed two ounces and a half (half a gill) of spirits—equal to one ounce and a quarter of alcohol; and it ought to be given well diluted with water—hot, if possible.

Even in cases where its utility is, with limitations, admitted, it is still a question whether extract of meat might not be better, as it certainly would be attended with less chance of evil result, should it not accomplish the immediate end contemplated. Admitting, however, that in cases where rapid stimulus is required alcohol is more useful than any of the proposed substitutes, there seems to be no valid ground for continuing its issue on campaigns as a regular ration. It would be better to carry it as an extra, and issue it only by the advice and with the concurrence of the medical officer.

XUM

SUMMER DRINKS.

The London *Chemist and Druggist* gives the following recipes for these seasonable beverages:

1. GINGER BEER.

Brown Sugar	2 pounds
Boiling Water	2 gallons
Cream of Tartar	1 ounce
Ginger, bruised	2 ounces

Infuse the ginger in the boiling water, add the sugar and cream of tartar; when luke-warm, strain, then add one-half pint of good yeast. Let it stand all night; then bottle. If desired, a lemon may be added, and it may be clarified by the white of one egg.

2. LEMON BEER.

Sugar	1 pound
Boiling Water	1 gallon
Lemon, sliced	1
Ginger, bruised	1 ounce
Yeast	1 teacupful

Let it stand from twelve to twenty hours, after which it may be bottled.

3. HOP BEER.

Sugar	4 pounds
Hops	6 ounces
Water	q. s
Ginger, bruised	4 ounces

Boil the hops for three hours with five quarts of water, then strain; add five more quarts of water and ginger, boil a little longer, again strain, add the sugar, and when lukewarm add one pint of yeast. After twenty-four hours it will be ready for bottling.

4. SPRUCE BEER.

Hops	2 ounces
Sassafras, in chips	2 ounces
Water	10 gallons

Boil half an hour, strain, and add:

Brown Sugar	7 pounds
Essence of Spruce	1 ounce
Essence of Ginger	1 ounce
Pimento, ground	½ ounce

Put the whole in a cask, and let cool; then add one-half pint of yeast, let stand twenty-four hours, fine and bottle it.

RELATION OF FOUL AIR TO CONSUMPTION.

"Experiment has shown that if an animal be kept confined in a narrow, closed apartment, so that the air supplied is always more or less vitiated by the carbonic acid which it expires, however well fed that animal may be, tubercle (consumption) will be developed in about three months." If this be the case, a large percentage of cases of consumption should be met with among the inmates of badly ventilated schools. But, fortunately, the disease is comparatively infrequent under the age of fifteen, and added to this is the protecting influence of the active exercise in the open air usually indulged in by school-children. It is upon the teachers that its blighting effects are most apparent, as they are predisposed by age, they neglect exercise in the open air, and *their mental labor is severe, and worry of mind exhausting*. Of eleven teachers who died during the last eight years within the limits of one county in Pennsylvania, two died of acute disease, one of an overdose of an habitual narcotic, and of nine attacked by consumption, eight died—six ladies and one gentleman; the other, a gentleman, will recover, at least for a time.—*From "Schoolroom-Ventilation," by Dr. P. J. Higgins, in Popular Science Monthly.*

SCIENTIFIC MISCELLANY.

THE PRESIDENTIAL COLD AIR MACHINES.

The apparatus which proved most satisfactory in cooling the chamber of the wounded President, was furnished by a Mr. Jennings, of Baltimore. It was devised for use in a new process of refining lard. According to the inventor's description the apparatus consists of a cast iron chamber, about ten feet long, three wide and three high, filled with vertical iron frames covered with cotton terry or Turkish toweling. These screens are placed half an inch apart, and represent some three thousand feet of cooling surface. Immediately over these vertical screens is placed a coil of inch iron pipe, the lower side of which is filled with fine perforations. Into a galvanized iron tank, holding 100 gallons of water, is put finely granulated or shaved ice (and salt when a low temperature is required). This water is sprayed upon the sheets in the lower tank constantly. In each end of the iron chamber are openings thirteen inches square. To the outer end of this chamber is a pipe connecting with an out-door air conductor. To the opposite end is connected a similar pipe leading into an ice chamber at its top, and from the bottom of the same a pipe leads to a small exhaust fan, and from the fan the now cold and dry air is forced direct into the President's room through a flue some twenty feet in length. Air at 99° temperature to-day is supplied at the rate of 22,000 cubic feet per hour at the register in the President's room at 54°, and

with the windows and doors open the temperature at the President's bed (twenty-five feet away) is maintained steadily at 75° day and night. When the cold air machine was introduced, it was intended to keep the windows and doors closed; and under these conditions the machine would create and maintain a temperature of 60° in the hottest weather without using the auxiliary ice-air chamber now used, which was the suggestion of Professor Newcomb and Major Powell, to meet the requirements of cooling the room with the doors and windows open. The closing of them gave the room an air of gloom. An extra ice-chamber fan and engine has been put up in a room opening into the hall near the first apparatus, to be used in case of accident, and to cool the corridors of rooms adjoining the President's.—*Scientific American.*

Professor Lowe recently gave a practical illustration of his cooling system at Norristown, of which we give the following account:

The apparatus of the company's office consists of a tin tube something over a foot in diameter, which opens into the outer air on the south side of the building. Thence it runs into the basement where it is conveyed into a sort of box or wheel house, containing and wholly inclosing a fan, which is revolved by a small engine. From the fan the pipe is conducted into a large wooden chest containing ice, and from the chest it is carried to a room on the first floor of a capacity of nearly 9,000 cubic feet, about the size of the President's chamber. By the motion of the fan the current is drawn in from the outer air, and driven through the ice chest to the room above. An entrance to the latter is effected by the simple process of passing the end of the pipe through a perforated board placed under the sash of a window.

At half past five o'clock the professor commenced operations. He took a "hygrometer" or instrument for measuring at once tbe heat and dampness of the air. When the fan commenced to revolve, the heat of the room, as indicated by the dry thermometer, was 83°, it having been cooled by a previous experiment in the morning. A stream of cold air poured in through the tube, and in four minutes the mercury fell to 77°. In eight minutes it reached 75°, and the hygrometer showed that the air, which at the beginning of the experiment had contained eight grains of moisture to the cubic foot, now contained only four and a half. As it grew colder it became more dry. Walking up into the pattern shop, Prof. Lowe found a carpenter planing cedar boards, and ordered him to put some of the shavings into a basket and set it in one of the compartments of the cooling chambers. Instantly a pungent and agreeable scent of cedar diffused itself through the room.

"Sitting here," said Mr. Lowe, "I can carry you through all the glens and groves of the country. All that I want is a few pine boughs, cedar branches and slips of mountain foliage. You can enjoy the temperature and odors of them all."

As he spoke the dry thermometer stood at 70½ and the wet one at ten degrees lower. The engine was running at its lowest possible rate, and the fan was making about 300 revolutions a minute. He placed the hygrometer in the mouth of the tube, where it received the full benefit of the cold air. The dry thermometer quickly fell to 65½°. It was then 6 o'clock, and the moisture was only two and one-half grains to the cubic foot. The room had grown so cold that summer clothing was uncomfortable, and the temperature was steadily maintained. At 6:25 a thermometer placed outside the building indicated 90° in the shade, and one in the center of the room 68°.

The apparatus furnishes 80,000 cubic feet per hour, and makes no perceptible noise in running. It is so arranged that ventilation can go on without passing the air over the ice, whenever the natural temperature is found sufficiently cool; or so that a part of the air can be cooled on its way in, and mixed with the natural atmosphere, whereby exactly the degree of temperature desired may be maintained without stopping the machine. It is controlled by the simple pulling of a cord by an attendant in the room.

A compact portable apparatus containing its own power has been devised by Prof. Lowe, which can be attached at a few hours' notice to any building, and used in cooling and ventilating either the entire building or any single room.—*Norristown Herald.*

ORIGIN OF LIFE INSURANCE.

Among the nations of antiquity, the Romans were the first to make an effort to arrive at a law of mortality. To this they were led indirectly by their highly developed system of jurisprudence. It became necessary at times to fix the value of life estates, *i. e.*, property owned during lifetime only, without the right of alienation or bequest, and to do so the probability of life had to be estimated. It appears that the method in common use was about equivalent to assuming that all persons who attain the age of thirty would certainly live to the age of sixty, and then certainly die. This purely arbitrary assumption was probably accepted by jurists as the simple solution of a difficult problem.

A great improvement was introduced by the Prætorian Prefect Ulpianus, one of the most eminent of Roman jurists. He published a table of mortality, in which a distinction was made between the different ages, and the probable number of years of life for each given. The rate of mortality assumed for the middle ages approximates to that probably prevalent previous to the seventeenth century. Whether this table was based upon actual observation or was purely speculative is not settled; but, if its estimates were correct, the chances of life above sixty years were very poor indeed among the Romans. However, these early efforts do not seem to have exercised any influence toward a proper investigation of the subject, and, having been forgotten they only possess a passing interest for us.

XUM

METEOROLOGICAL REPORT FROM JULY 20, TO AUG. 20, FROM OBSERVATIONS AT WASHBURN COLLEGE, TOPEKA, KAS.

BY PROF. J. T. LOVEWELL, DIRECTOR.

The principal characteristic of the weather from July 20th to August 20th, was the extremely high temperature which was specially noticeable from August 1st to August 20th. From the excessive heat on the 17th, one case of sun stroke is reported.

The precipitation of this month has not been sufficient to maintain the extensive crop prospects of this section. There being only .99 in. of rainfall since July 20th, and 1.43 in. from July 1st to August 20th. Highest temperature 106° on the 17th. Lowest temperature 39° on the 15th.

Highest barometer 29.17 on the 30th. Lowest barometer 28.81 on the 21st. Highest velocity of wind 35 on the 21st. Miles traveled by wind 7,737. A great many meteors were noticed from 9 P. M. to 12 on the 30th. The usual summary by decades is given below.

TEMPERATURE OF THE AIR.	July 20th to 30th.	Aug. 1st to 10th.	Aug. 10th to 20th.	Mean.
MIN. AND MAX. AVERAGES.				
Min	65.3	69.1	67.4	67.3
Max	87.0	95.8	94.0	92.3
Min. and Max	76.0	82.5	80 7	79.1
Range	21.5	26.6	26 6	24.9
TRI-DAILY OBSERVATIONS.				
7 a. m.	71.1	78.3	76.2	75 2
2 p. m.	80.9	94.0	91.3	88.7
9 p. m.	75.0	82.4	78.5	78.6
Mean	76.8	84.7	81.1	80.2
RELATIVE HUMIDITY.				
7. a m.	.78	.70	.77	.75
2 p. m.	.61	.48	.65	.58
9 p. m.	.70	.61	.70	.67
Mean	.69	.63	.72	.68
PRESSURE AS OBSERVED.				
7 a. m.	29.09	29.05	28.98	29.04
2 p. m.	29.07	29.01	28.94	29.01
9 p. m.	29.06	29.00	28 98	29.01
Mean	29.07	29.02	28.96	29 02
MILES PER HOUR OF WIND.				
7 a. m.	5.3	3 4	11.3	6.7
2 p. m.	10.1	12.8	13.9	12.3
9 p. m.	6.5	5 5	11.4	7.8
Total miles	2563	2081	3093	7737
CLOUDING BY TENTHS.				
7 a. m.	4.3	1.2	5.7	3.7
2 p. m.	7.0	2.8	5.0	4.9
9 p. m.	3.2	0.6	1.5	1.8
RAIN.				
Inches	.41	0.03	0.55	.99

RAILWAY AND CANAL TRANSPORTATION.

Eastward of Chicago and St. Louis a vast network of railways disputes the precedence with any and all other routes of transportation. There is now a fiercer rivalry than ever before. On Canadian soil the Grand Trunk Railway parallels the St. Lawrence system of canals, and extends beyond their Montreal terminus as far to the east as Quebec and Portland. The western terminus is overlapped by the distance between Port Colborne and Detroit, Sarnia, Collingwood, and other upper lake ports. At Collingwood, a friendly railroad relieves the steamers of freight that they so recently carried through the Welland, and delivers it to other parties or to the Grand Trunk at Toronto. In 1878, grain to the value of $272,803 passed over this route for the eastern or foreign market. In 1879, the value of grain transported was $1,536,351. This remarkable increase of traffic is to receive the attention of the United States government as a matter affecting the collection of customs and the interest of American shippers in general.

PHYSICS.

THE STORAGE OF ELECTRICITY.

Sir William Thomson, who is one of the highest living authorities, amply confirms the statement that a small box containing 1,000,000 foot-pounds of electric force has been conveyed from Paris to Glasgow. This small box was in reality a Faure secondary battery, in which the electricity can be accumulated and stored until it is required for use. By the application of the same kind of battery M. Faure has run a bicycle, and has also applied the principle to a small boat which has been successfully tried near Paris. Sir William Thomson has tested this battery, and reports that it does really afford a means of storing electrical force —a fact which is of vital interest and importance to the public. As we have previously pointed out, the great defect of dynamically-created electricity has been its existence only so long as the motive power was kept running. When the engine stopped the current ceased. Under the new plan this is no longer the case, and, as the eminent scientist named points out, the electric energy may be stored for household or other purposes, just in the same manner as water or gas. In this way we may light our houses, or utilize the electricity as power, under absolute control, and with a minimum of trouble and expense. Such being the case we may expect to witness an enormous development of the applications of electricity, assuming, of course, that the Faure battery is capable of indefinite reproduction on a practical scale. There are not wanting those who entirely dispute the value of the invention, and who ridicule the ideas set forth by Sir William

Thomson. Prof. Osborne Reynolds, of Owens College, Manchester, for instance, points out that, after all, 1,000,000 foot-pounds is a very small matter, being in fact just as much "energy" as is contained in 1½ ounces of coal. Coal, indeed, is to be our standard, according to Mr. Reynolds, and he predicts the utter failure of the plan for storing electricity. Professor Ayrton also comes forward as a critic, albeit one of a milder type. He admits the truth of the statement that 1½ ounces of coal contains 1,000,000 foot-pounds of energy, but he very pertinently asks how that force is to be extracted to its full extent. As a matter of fact it is impossible to attain that result, no known engine being capable of working with so minute a quantity of fuel. This is exactly where the difference lies. The coal may contain the power, but it is all latent, and not available without the aid of a much greater force than its own, whereas the electricity is all immediately available, and can be used wholly or partially at will. Besides this the coal once used is done with, whereas the Faure accumulator can be stored anew, and drawn upon as required. This is an essential distinction, and would seem to show that the criticism of Professor Reynolds is wholly beside the mark. Professor Ayrton intimates that himself and Mr. Perry are making attempts to convert at a low temperature the energy in coal into electric energy, and Sir William Thomson admits that if carbon could be extracted in this manner the result would be analogous to what is done by the Faure accumulator. So far, however, M. Faure alone has achieved success, and it is to his apparatus, therefore, that we must look for the speedy, practical solution of one of the great problems of the day. —*Ironmonger.*

CORRESPONDENCE.

NOTES FROM "CORRESPONDENCE SCIENTIFIQUE."

PARIS, July 12th.

The "Correspondence Scientifique" is a lithographed fac-simile of the articles on scientific subjects prepared for early information of the press and of individuals, by Chas. Varey, scientific editor of *La Presse*, a leading journal of Paris.

The last number received, dated the 12th *ultimo*, has articles under the following headings: "Optical Telegraph," from which it appears that the French military authorities have only recently brought into practical use, the Signal System adopted, perfected and most successfully used in the Union Army, through the latter part of the civil war.

"Hygienic Properties of Electric Illumination." An interesting article of which a translation is given below.

"Zoölogical Exploration of the Mediterranean." Giving latest results achieved by the Scientific Commission on board the national vessel "Travailleur," then in the Gulf of Lyons. Among other things the drag has discovered large Gorgons of the genus Isis, of an unknown species taken at a depth of 650 yards which offered to the explorers a marvelous spectacle; they emitted from their entire bodies, a green phosphorescent light of such intensity that when the animals were disturbed they seemed to produce a shower of fire. In the middle of one of the darkest nights it was possible to read by it (*ainsi*) very fine print.

"A Manufactory of Prehistoric Flints." Translated below.

"Dangers of Celluloid." In which it is stated that this product at first made from "camphor with an inexplosible cotton powder," is since made from compressed paper and mineral oil and has become inflammable and dangerous, and has already caused a great number of accidents.

"Pictures (Scenic?) of the Grand Opera." The celebrated work of a distinguished artist, Paul Bandry, observed to be obscured by the products of the combustion of gas used for illumination; it has been decided by the Minister of Public Works to substitute the electric light.

"Detective Ballot-Box." Describing a new style of glass ballot-box, proposed to be adopted in a law under discussion by the General Assembly. By means of special mechanism it permits an absolute check upon the number of ballots deposited, and renders easy to everybody to verify the number of votes cast at every moment of the day.

HYGIENIC PROPERTIES OF ELECTRIC ILLUMINATION.

The question of the hygiene of illumination in closed apartments, having lately been discussed by the Society of Natural Sciences, of Brunswick, Prof. Plasius and Doctor Hoppe have expressed their opinions upon the hygienic qualities of electric illumination.

After our contemporary "La Lumire Electrique," from whom we borrow the following details, Prof. Plasius remarked upon the advantages of electric illumination in respect to freedom from the injurious products of combustion, and that it does not offer as does gas, danger of explosion. In electric illumination, though there is combustion of carbon, the quantity of carbonic acid produced is excessively low, besides which, it produces no other deleterious gas.

Dr. Hoppe afterward gave account of his experiments upon variations of visual accuracy and the (comparative) facility of perception of colors under influence of different modes of illumination. It results from this study that in general visual sharpness is greater under gas than under daylight (?) and still more so under the electric light. With the latter illumination one recognizes red, green, blue and, above all, yellow, at much greater distance than by daylight. By gaslight colors are distinguished more easily than by day, but less easily than by electric light; yellow only being less visible under gas than under daylight.

XUM

After other observations of less importance the members arrived at this conclusion that to the present the hygienic qualities of electric illumination are insufficiently appreciated.

A MANUFACTORY OF PREHISTORIC FLINTS.

As everybody knows alimentary articles to the last are falsified; old furniture and antique faiences are imitated with a perfection causing the despair of true amateurs; but until now they have dared to touch prehistoric objects only very timidly. That seemed to be an industry, impossible of exploitation, with success and profit.

A sugar refiner of Picardy, ornamented with the pre-name of Polydorus, has proved less hesitating; to the refining of sugar, he decided to add a factory of *Cibelots* of ancient ages. The stone age appeared to him an excellent epoch to cause to fructify, in Picardy above all, which is much thronged by archæologists and anthropologists. Then this was an industry, the founding of which, exacted no great amount of capital, the handiwork and the first material are so low priced. A grindstone and some flints, and the manufacture is started.

By this means, as simple as ingenious, our Picardian Polydorus has sold at high price to an archæologist of the environs of Beauvais a varied collection of flint arms, a collection composed of a thousand objects, hatchets, knives, arrowheads, etc., as coming from a sepulcher discovered in a quarry.

The Anthropological Society of Paris, to whom these were submitted as an extraordinary find, found them, despite their beauty, despite their perfect imitation, of an authenticity no little doubtful. A commission was named to work new trenches in the neighborhood of the sepulchres from whence proceeded the objects in question. They discovered nothing like sepulchres of the stone age, but M. Mortillet, president of the commission, whose competency in questions of this nature is well known, had no delay in making another discovery, which was that M. Polydorus was a brazen-faced "mystificator."

We relate this story to put collectors on guard against such frauds.

ANOTHER PREHISTORIC MAN.

Some human remains, evidently of great antiquity, says the *Academy*, were discovered a few months ago at Carabacel, near Nice, and have been reported upon by a local scientific committee, as well as examined by M. de Quatrefages. The bones had not been artificially interred, but were found embedded in a deposit of calcareous clay; at a depth of about nine feet from the surface. This deposit was irregularly stratified, and contained a mixture of pliocene and eocene shells, showing that it had been formed by the reconstruction of the pre-existing strata. Of the bones the most remarkable is the lower jaw. This is sufficiently characteristic to enable De Quatrefages to refer it to the Cro-Magnon type. The fossil man of Nice, therefore, belongs to the same race as M. Riviere's skeleton from Mentone, both being probably of Paleolithic age.

PROCEEDINGS OF SOCIETIES.

THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

SYNOPSIS OF THE PROCEEDINGS OF THE THIRTIETH ANNUAL MEETING.

This Association met August 18, 1881, in Music Hall, Cincinnati, Ohio, in the presence of a large audience composed of the *savans* of this country, with many from abroad. The great organ of the hall first gave forth a magnificent voluntary, rendered in a masterly way, by Mr. Winthrop Sterling. Prof. George J. Brush, of the Yale Scientific School, then called the meeting to order. The retiring President, Mr. L. H. Morgan, of Rochester, being absent on account of sickness and advanced age, the usual address from this officer was omitted. Rev. Dr. Ridgaway, of Cincinnati, and Ex-Secretary J. D. Cox, delivered an address of welcome, which was replied to by President Brush. A very large list of members elected at a previous business meeting was then announced.

In the afternoon session the various sections and sub-sections met in their respective rooms and proceeded to elect officers for the current year.

In Section A, after the election of its officers, Chairman Mallery read an able paper on the Gesture Speech of Man, of which the following is an abstract:

Anthropology tells the march of mankind out of savagery in which different peoples have advanced in varying degrees, but all started in progress in civilization from a point lower than that now occupied by the lowest of the tribes now found on earth. The marks of their rude origin, retained by all, are of the same number and kind, though differing in distinctness, showing a common origin to all intellectual and social development, notwithstanding present diversities. The most notable criterion of difference is in the copiousness and precision of oral speech, and connected with that, both as to origin and structure, is the unequal survival of gesture signs, which it is believed once universally prevailed. Where sign language survives, it is, therefore, an instructive vestige of the pre-historic epoch, and its study may solve problems in philology and psychology. That study is best pursued by comparing the pre-eminent gesture system of the North American Indians with the more degenerate or less developed systems of other peoples.

The conditions and circumstances attending the prevalence, and sometimes the disuse, of sign language in North America were explained. The report of travelers that among Indians, as well as other tribes of men, some were unable to converse in the dark, because they could not gesture, is false. It is the old story of *barbarian*, applied by the Greeks to all who did not speak Greek, repeated by Isaiah of the "stammering" Assyrians, and now appearing in the term

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A sugar refiner of Picardy, ornamented with the pre-name of Polydorus, has proved less hesitating; to the refining of sugar, he decided to add a factory of *Cibelots* of ancient ages. The stone age appeared to him an excellent epoch to cause to fructify, in Picardy above all, which is much thronged by archæologists and anthropologists. Then this was an industry, the founding of which, exacted no great amount of capital, the handiwork and the first material are so low priced. A grindstone and some flints, and the manufacture is started.

By this means, as simple as ingenious, our Picardian Polydorus has sold at high price to an archæologist of the environs of Beauvais a varied collection of flint arms, a collection composed of a thousand objects, hatchets, knives, arrowheads, etc., as coming from a sepulcher discovered in a quarry.

The Anthropological Society of Paris, to whom these were submitted as an extraordinary find, found them, despite their beauty, despite their perfect imitation, of an authenticity no little doubtful. A commission was named to work new trenches in the neighborhood of the sepulchres from whence proceeded the objects in question. They discovered nothing like sepulchres of the stone age, but M. Mortillet, president of the commission, whose competency in questions of this nature is well known, had no delay in making another discovery, which was that M. Polydorus was a brazen-faced "mystificator."

We relate this story to put collectors on guard against such frauds.

ANOTHER PREHISTORIC MAN.

Some human remains, evidently of great antiquity, says the *Academy*, were discovered a few months ago at Carabacel, near Nice, and have been reported upon by a local scientific committee, as well as examined by M. de Quatrefages. The bones had not been artificially interred, but were found embedded in a deposit of calcareous clay, at a depth of about nine feet from the surface. This deposit was irregularly stratified, and contained a mixture of pliocene and eocene shells, showing that it had been formed by the reconstruction of the pre-existing strata. Of the bones the most remarkable is the lower jaw. This is sufficiently characteristic to enable De Quatrefages to refer it to the Cro-Magnon type. The fossil man of Nice, therefore, belongs to the same race as M. Riviere's skeleton from Mentone, both being probably of Paleolithic age.

PROCEEDINGS OF SOCIETIES.

THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

SYNOPSIS OF THE PROCEEDINGS OF THE THIRTIETH ANNUAL MEETING.

This Association met August 18, 1881, in Music Hall, Cincinnati, Ohio, in the presence of a large audience composed of the *savans* of this country, with many from abroad. The great organ of the hall first gave forth a magnificent voluntary, rendered in a masterly way, by Mr. Winthrop Sterling. Prof. George J. Brush, of the Yale Scientific School, then called the meeting to order. The retiring President, Mr. L. H. Morgan, of Rochester, being absent on account of sickness and advanced age, the usual address from this officer was omitted. Rev. Dr. Ridgaway, of Cincinnati, and Ex-Secretary J. D. Cox, delivered an address of welcome, which was replied to by President Brush. A very large list of members elected at a previous business meeting was then announced.

In the afternoon session the various sections and sub-sections met in their respective rooms and proceeded to elect officers for the current year.

In Section A, after the election of its officers, Chairman Mallery read an able paper on the Gesture Speech of Man, of which the following is an abstract:

Anthropology tells the march of mankind out of savagery in which different peoples have advanced in varying degrees, but all started in progress in civilization from a point lower than that now occupied by the lowest of the tribes now found on earth. The marks of their rude origin, retained by all, are of the same number and kind, though differing in distinctness, showing a common origin to all intellectual and social development, notwithstanding present diversities. The most notable criterion of difference is in the copiousness and precision of oral speech, and connected with that, both as to origin and structure, is the unequal survival of gesture signs, which it is believed once universally prevailed. Where sign language survives, it is, therefore, an instructive vestige of the pre-historic epoch, and its study may solve problems in philology and psychology. That study is best pursued by comparing the pre-eminent gesture system of the North American Indians with the more degenerate or less developed systems of other peoples.

The conditions and circumstances attending the prevalence, and sometimes the disuse, of sign language in North America were explained. The report of travelers that among Indians, as well as other tribes of men, some were unable to converse in the dark, because they could not gesture, is false. It is the old story of *barbarian*, applied by the Greeks to all who did not speak Greek, repeated by Isaiah of the "stammering" Assyrians, and now appearing in the term

slav (speaker), as contradistinguished by the Russians from the Germans, whom they stigmatize as *Njemez* (tongueless).

The theory that sign language was the original utterance of mankind does not depend upon such tales or prejudices. After the immeasurable period during which man has been upon the earth, it is not probable that any existing peoples can be found among whom speech has not obviated the absolute necessity for gesture in communication between themselves.

The assertion made that the sign language of Indians originated from some non-defined tribe or region supposes its comparatively recent origin, whereas the conditions favorable to its development existed very long ago and were co-extensive with the territory of North America occupied by any of the tribes. Numerous evidences were presented as to its antiquity and generality. But the signs are not now, and from the nature of their formation never were, identical and uniform. The process is the same as among the uninstructed deaf mutes when associated together, which was explained.

A comparison sometimes made of the diversities of the sign language of the Indians with the dialects and provincialisms of the English language, is incorrect, as there is so small a proportion of the sign-using tribes which make identically the same signs, express the same ideas, and also because the signs are not absolute and arbitrary as are the words of English.

Sign language, as a product of evolution, has been developed rather than invented, but each of the separate signs had a definite origin arising out of some appropriate occasion, and the same sign may thus have had many different origins due to identity in the circumstances. No signs in common use were at first conventional. What may appear to be conventional largely consists in the differing forms of abbreviation which have been adopted. Yet, while all Indians, as well as all gesturing men, have many signs in common, they use many others which have become conventional in the sense that their etymology and conception are not now known or regarded by those using them. The conventions by which such signs were established, occurred during long periods and under many differing circumstances. Our Indians, far from being a homogeneous race and possessing uniformity in their language, religions and customs, differ from each other more than all the several nations of Europe, and their semiotic conceptions have correspondingly differed.

Instances were presented of the ascertained permanence of some Indian signs, and those of foreign peoples and deaf mutes. Though they, as well as words, animals and plants, have had their growth, development and change, those which are general both among Indian tribes, and are also found in other parts of the world, must be of great antiquity. Many signs but little differentiated were unstable, while others that have proved to be the best modes of expression have survived as definite and established.

The Indian system as a whole was compared with those of foreign peoples—the ancient Greeks and Romans, the modern Italians, the Turks, Armenians and

Koords, the Bushmen of Africa, the Rijangs and Lelongs of Sumatra, and the Australians. The result is that the so-called sign language of Indians is not, properly speaking, one language, but that it and the gesture systems of the deaf mutes and of all peoples constitute together one language, the gesture language of mankind, of which each system is a dialect. The generic conformity is obvious, while the occasion of specific varieties can be readily understood.

The most interesting light in which Indians, as other lower tribes of men, are to be regarded is in their present representation of the stage of evolution once passed through by our ancestors. Their signs, as well as their myths and customs, form a part of the paleontology of humanity. Their picture writings are now translated by working on the hypothesis that their rude form of graphic representation, when at the same time a system of idiographic gesture signs prevailed, would probably have been connected with the latter; traces of the signs now used by the Indians are also found in the idiographic pictures of the Egyptian, Chinese and Aztec characters.

From the records of the ancient classic authors and also from the figures on Etruscan vases and Herculanean bronzes and other forms of Archaic art, it is certain that a system of gesture language is of great antiquity. Later Quintilian gave elaborate rules for gesture which are specially notable for the significant disposition of the fingers still prevailing in Naples. The ancient and modern pantomimes were discussed, and also the gestures of speaking actors in the theaters, the latter being seldom actually significant or self-interpreting even in the expression of strong emotion. The same scenic gesture must apply to many diverse conditions of fact. Its fitness consists in being the same which the hearer of the expository words would spontaneously assume if yielding to the same emotions, and which, therefore, by association tends to induce sympathetic yielding. But the facts themselves depend upon the words uttered. A true sign language would express the exact circumstances without any exhibition of the general emotion appropriate to them.

This was shown to be in successful use in cases cited by travelers skilled in it, and its powers were compared with those of speech. It finds actually in nature an image by which any person can express his thoughts and wishes on the most needful subjects to any other person. Merely emotional sounds may correspond with merely emotional gestures, but whether with or without them would be useless for the explicit communication of facts and opinions by which signs themselves are capable. Notwithstanding frequent denials, they do possess abstract ideas. The rapidity of communication is very great, and can approach to that of thought. Oral speech is not conventional, and with the similar development of sign language conventional expressions could be made with hands and body more quickly than with the vocal organs, because more organs could be worked at once.

But such rapidity is only obtained by a system of preconcerted abbreviations and by the adoption of absolute forms, thus sacrificing self-interpretation and naturalness.

Signs often gave to spoken words their first significance, and many primordial roots of language are found in bodily actions. Examples are given of English, Indian Greek and Latin words in connection with gesture signs for the same meaning, and the structure of the sign-language was compared with the tongues of this continent, with reference also to old Asiatic and African languages, showing similar operations of conditions in the same psychologic horizon.

It is necessary to be free from the vague popular impression that some oral language of the general character of that now used by man is "natural" to man. There is no more necessary connection between ideas and sounds, the mere signs of words that strike the ear, than there is between the same ideas and signs for them which are addressed only to the eye. Early concepts of thought were of direct and material characters. As is shown by what has been ascertained of the radicals of language, and there does not seem to be any difficulty in expressing by gesture all that could have been expressed by those radicals.

It may be conceded that after man had all his present faculties he did not choose between the adoption of voice and gesture, and never with those faculties was in a state where the one was used to the absolute exclusion of the other. The epoch, however, to which our speculations relate is that in which he had not reached his present symmetric development of his intellect, and of his bodily organs, and the inquiry is: Which mode of communication was earliest adopted to his single wants and informed intelligence? With the voice he could imitate distinctively but few sounds of nature, while with gesture he could exhibit actions, motions, positions, forms, dimensions, directions and distances, with their derivations and analogies. It would seem from this unequal division of capacity that oral speech remained rudimentary long after gesture had become an efficient mode of communication. With due allowance for all purely imitative sounds, and for the spontaneous action of vocal organs under excitement, it appears that the connection between ideas and words is only to be explained by a compact between speaker and hearer which supposes the existence of a prior mode of communication. This was probably by gesture. At least we may accept it as a clew leading out of the labyrinth of philological confusion, and regulating the immemorial quest of man's primitive speech.

In the evening session Captain C. R. Dutton read a paper on the Grand Cañon of the Colorado River, of which the following brief abstract is given:

A picture was exhibited of a portion of the chasm about the middle of its length, which was typical of its features throughout a great portion of its extent. It consists of an inner and an outer chasm. The outer chasm is about five or six miles wide, with a row of palisades two thousand feet high on either side, and a broad and comparatively smooth plain between. Within this plain is cut the inner gorge, descending more than three thousand feet lower, and with a width of about three thousand five hundred feet. The upper palisades are of very noble form and uniform profiles, with a highly architectural aspect. Pictures were also exhibited of the chasm as seen from below.

The speaker then conducted his hearers to the region lying north of the chasm. The region through which it extends consists of carboniferous strata, but about forty miles north of the river appear strata of later age, forming a series of terraces, each terrace being terminated by a line of gigantic cliffs, one thousand to two thousand feet high, and of very wonderful sculpture and brilliant color; the strata in this stairway of terraces are the remnants of beds which are stretched unbroken over the entire district now drained by the Grand Cañon. The total thickness of the beds removed was more than ten thousand feet, and the divided area more than thirteen thousand square miles. This denudation began in the Eocene time, and has been continuous until the present. A great amount of uplifting has also occurred during the same period, varying according to locality from sixteen thousand to nineteen thousand feet, and the present altitude of the region is the difference between the amount of uplift and the thickness of strata removed—*i. e.*, seven thousand to nine thousand feet. The cutting of the Grand Cañon is thus merely the closing episode of a long period of erosion. Captain Dutton states that the cutting of the present chasm is a comparatively recent geological event, and probably had its beginning in the Pliocene time.

The process of excavating the cañon was then briefly explained. It consists in the action of two classes of natural causes. The first is the scouring action of the stream upon the rocks in its bed. The stream is a fierce torrent, carrying large quantities of sharp sand, which acts like a sand-blast. A river will always cut down its bed when the quantity of sediment it carries is less than it is capable of carrying. When this quantity is greater a part of it is thrown down upon its bottom, protecting it from scouring. In this respect the Colorado is an exceptional river. The other process is weathering. The stream cuts a chasm no wider than its water-surface. But the cut thus made is widened by the secular decay of the walls of the chasm which, though slow to the perception becomes great after the lapse of many thousands of years. The peculiar architectural profiles were explained as being due to different degrees of resistance afforded by different beds to the action of weathering. Captain Dutton then exhibited views of the grandest portions of the chasm. Although the magnitudes of the component parts are very great, the highest sublimity is found in the sumptuous and noble rock temples and beautiful sculpture of the walls, which show almost incredible resemblances to human architecture. The colors also are very brilliant and rich.

The Grand Cañon is about two hundred and twenty miles long, from five to twelve miles wide, and from five thousand to six thousand feet deep. Those who have seen it all unite in declaring it to be the most sublime and impressive of all natural features in the world.

The first paper on the programme, in section A for the second day, was that of J. E. Hilgard, "On recent deep-sea soundings in the Gulf of Mexico and Caribbean Sea, by the United States Coast Survey," which, in the absence of its author, was read by Dr. W. H. Dall. The paper was well prepared and instruct-

ive, and showed among other interesting facts, that the Gulf is not a shallow continental sea, like the Irish Sea for instance, but is a true oceanic body, of as great depths as the Atlantic.

R. H. Thurston's paper "On the Effect of Prolonged Stress upon the Strain in Timber" was read by the Secretary, Professor Tappan, of Kenyon College, and was freely but not unfavorably discussed.

"A remarkable case of the retention of heat by the earth," by H. C. Hovey, treats of a bed of ashes buried thirty feet deep, in Nova Scotia, on the top of a bed of bituminous coal, over which trees showing an age of over two hundred and twenty-five years were growing. These ashes show that they still retained a very appreciable portion of the heat of the fires that must have been kindled from two to three hundred years ago.

"Alhazen's Problem; its history and bibliography, together with various solutions of it," by Marcus Baker, was a paper of ability, but of more interest to the lovers of pure mathematics than to the practical public.

"On the Electrical Resistance and Co-efficient of Expansion and Incandescent Platinum," by E. L. Nichols.

"On a Simple Method of Measuring Faint Spectra," by Wm. Harkness.

The two following papers were the last on the programme for the day, in Section A proper: "Suggestions for Improvement in the Manufacture of Glass, and New Methods for the Construction of Large Telescopic Lenses," by G. W. Holley.

"The Stereoscope and Vision by Optic Divergence," by W. Le Conte Stevens.

Several papers on the programme of Section A were omitted, the authors being absent. In the subsection of Microscopy, Mr. Thomas Taylor read a paper entitled "New Freezing Microtome." In Section B the following papers were read:

"A Revision of the Anatomy of the Ethmoid Bone in the Mammalia," by Harrison Allen. "On Bopyrus Manhattensis from the Gill-cavity of Palæmonetes Vulgaris Stimpson," by Carl F. Gissler. "The Life Unit in Plants," by Byron D. Halsted.

The paper "On a Mesal Cusp of the Deciduous Mandibular Canine of the Domestic Cat, Felis domestica," by Burt G. Wilder, was read by Professor Tuttle, of Columbus, Ohio, and "Note on Some Fish Remains from the Upper Devonian of New York," by H. S. Williams; "Notes on Specimens of Ptilophyton and Associated Fossils Collected by Dr. H. S. Williams in the Chemung Shales of Ithaca, N. Y.," by J. W. Dawson, were read by Professor H. S. Williams, of Cornell University, New York, the author of the first one.

"Typical Thin Sections of the Rocks of the Cupriferous Series in Minnesota," by N. H. Winchell, was read by its author.

"On the Disposition of Color-markings of Domestic Animals," by Wm. H. Brewer, was read by its writer in an animated tone of voice that could be heard, which can not be said of all others.

"Short Study of the Features of the Region of Lower Great Lakes, during the Great River Age; or Notes on the Origin of the Great Lakes of North America," by J. W. Spencer, was the longest paper of the day, though it was listened to with great interest all through, and was considerably discussed.

"On the Cause of the Arid Climate of the Far West," by Captain C. E. Dutton.

Lieutenant-Governor Wm. Bross, of Illinois, read a paper entitled "Cañons as I Have Seen Them, with Some Thoughts as to their Origin."

The first paper in Section D, sub-division of Anthropology, was read by Professor O. T. Mason, "On Uncivilized Mind in the Presence of Higher Phases of Civilization," a most interesting document. Its author has been engaged during the past year in collecting the statistics of Indian education from the earliest efforts in that direction to the present time, under the patronage of Major J. W. Powell, Chief of the Indian Division of the Tenth Census. During his investigation Professor Mason was led to consider the philosophic side of the subject and his results, so far as ascertained, are embodied in this paper on the effect of higher on lower civilizations.

"A Lawgiver of the Stone Age," by Horatio Hale, was read by Mrs. Smith, of the Bureau of Ethnology, Washington, D. C.

"Mound-builders' Skeletons," by Watson C. Holbrook, was next read. Though a short paper it was an excellent one, closely listened to.

The next paper was entitled "The Stone Images and Idols of the Mound-builders," by William McAdams, who had present as a sort of text and illustration either the casts or the originals of many most valuable and rare specimens of sculptured images, pipes, etc., largely owned by Dr. Snyder, of Illinois. Mr. McAdams is himself an indefatigable collector and worker in the field of pre-historic American remains.

Among all the relics of the Stone Age, nothing is of more interest to the student of ethnology, than the sculptured forms of men and animals found on some of the objects taken from the mounds.

Mr. McAdams divides these sculptured objects into four classes, representing, it may be, four periods of advancement:

1. The mound pipes with a curved or crescent-shaped base forming the stem, the bowl of the pipe representing some animal. These pipes are not made of very hard stone, as has been generally supposed. They are quite small and delicate, many of them showing both taste and skill in manufacture.

2. This class is a much larger, and sometimes exaggerated, representation of men and animals, many of them having a crouching, Sphinx-like form strongly resembling some of the ancient Assyrian forms from the Nile. While some of these figures have no perforation, the majority of them have two funnel-shaped connected perforations, and they are in all probability used as a pipe on occasions of great ceremony. Some of these images, from mounds in Illinois, and weighing ten to twenty pounds or more, are sculptured from hard stone, and are among the finest works of the Stone Age.

3. Is a class of singular mask-like figures, in which the human face alone is represented, presumably of the natural size. A very fine specimen of a hematite from a mound in Missouri was exhibited.

The fourth class of the sculptured objects were representations of the human form, and may have been real idols. One of them, from a mound in Union county, Illinois, is cut from quartzite, one of the most refractory rocks we have. The body is represented in the sitting posture, the hands on the knees. The face, which is not a bad one, is composed and natural, but has not the features of our modern Indian. The figure is smooth and highly polished, and is, perhaps, the finest piece of aboriginal sculpture that has been found in the United States.

Mr. McAdams thinks these objects exhibited by him were connected, or used, in their religious observance. The speaker thought the evidence from the mounds would seem to show that the Mound-builders were fire-worshipers, and perhaps adored the sun. Sometimes at the burial of noted persons, human sacrifice was made. In exploring some of the large mounds of Illinois he has found as many as ten and fifteen buried human sacrifices around a central skeleton, with rich implements of stone.

Mr. McAdams' most interesting paper was illustrated by a large number of images and idols which he described, and which he has taken from the mounds of Illinois and Missouri. It has heretofore been held by some of our best archæologists that it were doubtful if we had any American idols, but it is claimed by others that we not only have stone idols from the latter mounds, but that, as is claimed by Mr. McAdams, human sacrifice in the most hideous form was made to the stone objects. One of the idols shown, found in Union county, Illinois, weighs over forty pounds, and is carved from that most refractory of rocks, quartz, and as a work of art is no mean effort. It is singular that this figure, which has a good face, does not resemble that of our red Indian. We are glad to see these subjects, which have for so many years been covered by so much mystery, being investigated by our scientific men. The Mississippi Valley is a grand field for explorations. The beautiful mound pipes shown by Mr. McAdams, one of which is a fine figure of the American eagle, with his defiant and erect attitude, is very artistic, and shows, too, that Illinois had the same race of Mound-builders as Ohio. In fact they are found everywhere, as Mr. McAdams pointedly remarked: "It is most singular that all primitive men, no matter where their remains are found, seem to have done precisely the same things, in the same way."

J. G. Henderson, of Illinois, read a paper on the "Houses of the Ancient Inhabitants of the Mississippi Valley."

Papers were also read: "On the Inhabitants of Northeastern Siberia, commonly called Chukchis and Namollo," W. H. Dall.

"Comparative Differences in the Iroquois Group of Dialects," Mrs. Erminnie A. Smith.

"On the Ancient Japanese Bronze Bells," Edward S. Morse.

In Section F, permanent sub-section on Entomology, the following papers were read: "On Certain Habits of Heliconia Charitonia," W. H. Edwards.

"Life-History of the Buckeye Stem-borer. *Sericoris intstrutana* Clem," E. W Claypole.

"New Insects Injurious to American Agriculture," C. V. Riley.

"The Egg-case of Hydrophilus triangularis," C. V. Riley.

"On the Oviposition of Prodoxus decipiens," C. V. Riley.

"The Cocoon of Gyrinus," C. V. Riley.

The geologists of America attending the Association, held a meeting and resolved to form an "Association of American Geologists."

The third day's session of the Association commenced with some general business in reference to raising $4,000 for the purpose of publishing certain numbers of the Transactions now out of print. Subscription papers were circulated and an additional $110 was quickly raised.

Professor Swallow made a statement in reference to the formation of an American Geological Society. The movement was not hostile to the American Association, as they did not intend to withdraw themselves from that Society. In the readjustment of sections they wished to consult about their relation to the Association and their wants. They desired to form a geological library as it is almost impossible for a private library to gather the publications now issued from a hundred sources. One can scarcely describe a new fossil now for fear some one has already described it. After electing a large number of new members, the Association received a report from the standing committee upon the subject of conferring the degree of Doctor of Philosophy. The report concurred with the American Philological Association in deprecating the custom of many colleges in conferring the degree, not by examination, but *honoris causa*. The report was thoroughly discussed and unanimously adopted. There are three hundred and sixty institutions of collegiate grade in the United States, and the conferring of the higher degree, *honoris causa*, has worked much harm against sound learning. If a scientist wants a Ph. D. let him study for it.

After receiving invitations from Minneapolis and Toronto for holding the next meeting of the Association, the regular order of business was taken up for the reading and discussion of papers.

The first paper, in Section A or Physics, upon the programme was upon the subject of the "Magnetic Survey of Missouri," by Francis E. Nipher, but owing to the necessary absence of that gentleman it was read by Professor Mendenhall. It was a brief discussion of results of his experiments to ascertain the dip of the magnetic needle in the State of Missouri, and the influence of the Iron Mountain and other natural causes upon the compass.

D. P. Todd was absent, and his paper upon the "Comparison of Newcomb's Tables of Uranus and Neptune with those of the same Planets by Le Verrier," was not read.

One of the best talks of the day in this section was Professor Wm. Harkness' address "On the Methods of Determining the Solar Parallax, with Special Refer-

ence to the Coming Transit of Venus," which was received with enthusiastic applause. He divided the methods for finding the sun's parallax into three classes, the trigonometrical, the gravitational, and the third, the name of which he coined for the occasion, the pho-tachymetrical. The latter is the best, and consists in a process by means of the use of the measurements of the velocity of light. This method, the most modern, was fully explained and illustrated by blackboard drawings.

Professor T. C. Mendenhall opened the afternoon session by reading an elaborate and quite interesting paper "On the Wave-lengths of the Principal Lines of the Solar Spectrum." It consisted of a brief discussion of the processes and instruments made use of in the measurement of wave-lengths, of certain imperfections, in the defraction, grating and causes to which they are due, and the numerical results of the investigation. He showed that the inequalities observed in solar spectra were due to the variations in the plane of polarization, and concluded with a prophecy that in the future the use of the wave-length of light as the standard of linear measure would be as universal as the use of water as the standard of density.

Samuel Marsden, of St. Louis, read a description of his experiments to determine the comparative strength of globes and cylinders of the same diameter and thickness. He exhibited some lead globes and cylinders four inches in internal diameter and one-fourth of an inch in thickness, which he had used in his experiments with a hydraulic testing machine. The theoretical strength of the cylinder is proportional to the diameter and tensile strength of its sides. Calculating this, and comparing it with the results of the actual strength, as determined by his experiments, it was found that in but one case out of eight was the result identical. This he ascribed, not to the imperfection of his experiments, but to the failure of the rule.

Mr. T. Sterry Hunt then explained his peculiar views upon the nature of interstellar ether by an address on "Historic Notes on Cosmic Physiology."

"The White Pine: Its Origin and Natural History; Statistics of Its Industry in Michigan; The Coming Substitute for Lumber," by William Hosea Ballou, of Evanston, Ill. This paper possesses much general and commercial, as well as scientific value. The author showed that at the present rate of demand the white pine supply will be exhausted in about seven years.

Science will doubtless devise other materials as a substitute. Indeed, I have been shown a material manufactured in Chicago in the shape of a board one inch thick, made from wheat straw, which can be colored to represent any lumber now known, so accurately as to deceive the eye. The inventor manufactures two thousand square feet from a ton of straw. It is more durable and much cheaper than lumber. As a parallel to the use of paper wheels, Mr. Pullman is now finishing off three palace cars in this material. The limit of its manufacture will depend only on the production of wheat straw.

The proceedings of Section C, Chemistry, were opened by a discussion of the paper presented yesterday by Mr. H. C. Hovey, on "Coal Dust as an Ele-

ment of Danger in Mining." At the request of the chairman the author of the paper gave a brief recapitulation of its principal points, and claimed it to be proved by the circumstances of the Albion Mines explosion:

1. That coal-dust, under favorable conditions, becomes the vehicle of flame.
2. That it thus spreads and augments gas explosions.
3. That it may determine and precipitate explosions due to the presence of inflammable gas in otherwise harmless and scarcely appreciable quantities.

The subject was further discussed by others, most of the time being occupied by Professor Peckham, who regarded coal-dust, when finely pulverized, as an explosive substance, and not merely a vehicle of flame. In proof of this he gave some highly interesting facts concerning explosions of flour-dust in the mills of Minneapolis. He held that the matter was one of the greatest practical importance to miners and millers.

The following papers were read:

"On Iso-picraminic Acid," Charles W. Dabney, Jr.

"Composition and Quality of American Wines," Henry B. Parsons.

"On Chlortribrompropionic Acid," C. F. Mabery and H. C. Weber.

"Is the Law of Repetition the Dynamic Law Underlying the Science of Chemistry?" Miss Virginia K. Bowers.

"The Limited Biological Importance of Synthetic Achievements in Organic Chemistry," Albert B. Prescott.

"The Constitution of the 'Atom' of Science," Mrs. A. B. Blackwell.

"On Dibromiodacrylic and Chlorbromiodacrylic Acids," C. F. Mabery and Rachel Lloyd.

"Pentachloramyl Formate," Alfred Springer.

"Evidence of Atomic Motion Within Molecules in Liquids as Based Upon the Speed of Chemical Action," R. B. Warder.

Prof. J. Lawrence Smith read two papers on the following subjects: "Iron with Anomalous Chemical Properties," and "Hiddenite, a New American Gem."

Prof. G. C. Swallow, of Missouri, read an able paper on "Ozark Highlands," after which came a paper by Professor Edward S. Morse. In this paper Mr. Morse showed that considerable change had taken place between the species of shells forming the ancient deposits of shells made by the Indians along the coast of New England and the same species living on the coast to-day.

By measuring a large number of specimens from the deposits and a similar number of specimens of the same species living to-day, he had found the proportions of the shells constantly unlike. As an example he cited the common clam (*mya*), the species as it occurs in the shell-heaps being higher in proportion to its length than the same species living to-day. He had already called attention to similar changes in the shell-heaps of the Bay of Yedo, Japan.

Dr. H. D. Schmidt's paper "On the Influence of the Structure of the Nerve-fibers upon the production and conduction of Nerve-force," was a long one—so long that the Chairman felt obliged to prevent its full reading, it having already

consumed more than its allotted time—forty-five minutes. It showed care in its preparation.

The next was the able paper, "The Berea Grit of Ohio," by President Edward Orton, which was listened to with great attention, as it deserved.

In the section of Entomology Professor W. H. Edwards, pronounced by good authority to be the ablest and most learned man on the subject of butterflies, read an able paper "On the Length of Life of Butterflies," after which two papers, also excellent and able, "On the Duration of the Heterocera (Moths)," and "A Remarkable Invasion of Northern New York by a Pyralid Insect (*Crambus vulgivagellus*)," were read by J. A. Lintner.

Professor Edwards then read another paper "On an Alleged Abnormal Peculiarity in the History of Argynnis Myrina."

J. A. Cook read three papers, entitled as follows: "How Does the Bee Extend Its Tongue," "The Syrian Bees," "Carbolic Acid as a Preventive of Insect Ravages."

The last paper read was upon the "Life-History of the Buckeye Stem-Borer," by Professor E. W. Claypole.

The first paper in the Anthropological section was read by Professor W. J. Hoffman, of Washington, upon the "Interpretation of Pictographs by the Application of Gesture Signs." The paper was illustrated by a large number of Indian pictographs, and, to be thoroughly understood, should be considered in connection with the address of the chairman of this section, upon "Gesture Language." The speaker showed that in many instances the native artist attempted to convey ideas by presenting to the eye, as near as the nature of the subject would permit, representations of the gestures used to represent the same idea in sign language. The paper was highly instructive, and no synopsis can do it justice for want of illustrations.

"Remarkable Relics from Illinois Mounds." This was a short talk by Mr. McAdams, illustrated by numerous specimens taken from Illinois mounds with his own hands. He is a zealous worker in a field where work counts—that is, he shoulders his spade and pick and explores for himself the antiquities in his neighborhood, and reports his finds accurately to the Association. His remarks are always listened to with pleasure.

The next paper was by Professor Edward S. Morse, "On the Ancient Japanese Bronze Bells." The subject was curious, and was admirably illustrated by sketches upon the blackboard. In this department, that of off hand drawing upon the board or canvas, Professor Morse is without an equal in the Association.

Following this paper was one by Mrs. Erminie Smith, the charming lady anthropologist of the Association. It was upon "The Animal Myths of the Iroquois." She gave several illustrations of the oral literature of that unlettered race—a literature that is fast fading from the face of the earth! These oral tales were reduced to writing by Mrs. Smith as she received them from the lips of aged Indians. She is proud of the fact that she is an adopted Tuscarora, and waves

the flag of *her* people in friendly triumph over the heads of her brother anthropologists.

The next paper was by Judge Henderson upon the question as to whether the antelope ever ranged over the prairies of Illinois. The speaker said that he read a paper in February last, before the Natural History Society of Illinois, on the "Ancient Inhabitants of Illinois," in which he enumerated the antelope as one of the animals hunted by the primitive people upon the great prairies of that State. From the fact that Judge Caton had failed in attempting to domesticate this animal in Illinois, some of the members of that Society raised a question as to whether it ever was a part of the *fauna* of that locality. In a letter from Judge Caton to the speaker, the writer stated that he attached no importance to the failure in attempting to domesticate this animal, as similar attempts within the present range of the antelope proved more abortive than those made by him. Judge Henderson then proceeded to give extracts from old French authors, some of which were written more than two hundred years ago, in which two distinct animals of the deer family were mentioned, the cerf, or deer proper, and chevreuil, or the antelope.

The Secretary read two papers by Mr. Watson C. Holbrook, of Illinois, one on "Prehistoric Hieroglyphics," and the other upon "Stone Implements in the Drift," after which Mr. S. H. Trowbridge, from Missouri, exhibited some remarkable archæological specimens found in this State.

At the opening of the general session of the Association, the fourth day, Professor Rogers of Boston, the first president, was elected to the honorary fellowship of the Association, the first one to receive that title.

Professor Mendenhall, of Columbus, by permission, rose to state that the Seismological Society of Japan, was making valuable contributions to science on the subject of earthquakes. Japan has facilities for observing the phenomena attending terrestrial disturbances that are equaled by no other country. Earthquakes occur on an average once in two weeks, and this Society, though poor and contending with many difficulties, is doing a noble and important work—a work which can be done by no other society in the world.

The Association resolved to hold its next meeting at Montreal, and a warm and pressing invitation to hold the meeting in 1883 in Minneapolis, was referred to the standing committee.

The authors of papers No. 1 and No. 2 being absent, they were read by title only. The first was "Upon the Use of the Induction Balance as a means of Determining the Location of Leaden Bullets in the Human Body," by Professor Alexander Graham Bell. It gave an account of the experiments made to locate the bullet in the body of President Garfield by means of the induction balance.

The second was also by Professor Bell. It was "Upon a New Form of Electric Probe," and gave an account of the experiments which have led to the discovery that the presence of a bullet imbedded in the human body in any suspected locality can be demonstrated by the insertion through the skin of a fine needle electrically connected with the telephone.

Professor H. T. Eddy, of the Cincinnati University, then read his paper "On a New Method of Applying Water-power of Small Head to Effect the Direct Compression of Air to any Required High Pressure."

Dr. J. Lawrence Smith followed with an explanation of "The Needle Telephone," a new instrument invented by Dr. Goodman, of Louisville, Ky. The invention made use of needles arranged between two coils and a tightly-stretched diaphragm, instead of the usual coils and loose diaphragm used in the Bell and other telephones. It was stated that the Needle Telephone is really much better than any other telephone, but on account of existing patents could not be used at present. He hoped, however, that a "transmitter" would yet be invented upon some principle not falling under present patents, which, combined with Dr. Goodman's invention, could yet be utilized.

The paper occasioned remarks by Dr. Smith, and others upon the present condition of the American patent laws, and the sentiment was universally expressed that there is urgent need for reform.

Professor W. LaConte Stevens read a paper on an "Improved Sonometer."

Section A reassembled in the afternoon, and the session was opened with a paper by Prof. Ormond Stone, on "The Great Outburst Comet *b*, 1881, observed at the Cincinnati Observatory." Mr. Wilson, Prof. Stone's assistant, being present was called upon and stated that while looking through the telescope on the evening in question he noticed a peculiar and unnatural brightness in the comet. He at first supposed that the telescope was not properly focused, but, after adjusting the focus by a fixed star, he found on re-examining the comet the same unnatural glare on the side toward the tail, and observed a black line extending across the comet.

Professor Stone continued: He having been called by Mr. Wilson, hastened to examine the comet. He noticed the same peculiarities described by Mr. Wilson. The color was red to the hue of the fan.

The next paper was that of Prof. J. R. Eastman, of Washington, on the "Method of Determining the Value of the Solar Parallax from Meridian Observations of Mars." This was described as the most trustworthy of all methods for determining the solar parallax. It consists, in general, of observing at two different times, say at night and the following day, eight fixed stars, four north and four south, of the observer. By comparing these observations and observations taken of the planet Mars at the same times, the error occasioned by diffraction is corrected.

Professor H. A. Newton, of Yale College, then read a paper on "Numbers of Cometary Orbits Relative to Perihelion Distance." After discussing several hypotheses, the Professor showed mathematically that the orbits of comets are really parabolas, and they belong in some sense to the system of the earth.

Professor Peirce, of Johns Hopkins University, read a paper "On the Comparison of the Yard and Meter by Means of the Reversible Pendulum."

Thomas Bassnett, of Jacksonville, Florida, read a lengthy paper ascribing meteorological disturbances to the effect of "Seven Electrical Vortices."

D. W. Prentiss, in Section B, read an interesting paper entitled, "On the Action of Pilocarpin in Changing the Color of Human Hair," which was of great interest.

Dr. George Sutton, of Aurora, Indiana, read a paper entitled, "The Gold-bearing Drift of Indiana." It gave in detail and in technical language the supposed glacial history of that State, and the different directions and paths followed by the different glaciers.

The paper showed that there is a line of gold-bearing drift extending across the State from Southeastern Indiana in a west and northwest direction to Illinois; and that the drift along this line is comparatively rich in gold, while the gold that is found in other parts of the State is in such small quantities that it is with difficulty that it can be detected.

There is a vast extent of country on the northern portion of our continent from which glaciers moved, and a large extent of country which has never yet been carefully examined, and I think we are not visionary in saying that we believe it is probable that rich gold veins may yet be discovered beyond the lakes which will give rise to all the excitement incident to the discovery of new gold fields, and the miner, the capitalist, the speculator, the emigrant and the adventurer may hurry to a region of country which is now but a barren wilderness, and villages, cities and railroads spring into existence as if by magic, and scenes be enacted in the North similar to that we have so recently witnessed in the West.

Professor Richard Owen read a paper on "The Unification of Geological Nomenclature." A geological nomenclature has grown up in every country, and almost in every State, and the paper advocated a uniform system. The geologist at present is burdened with many names arising in different countries which indicate the same things.

The last paper read in this Section was: "Recent Discoveries, Measurements and Temperature Observations made in Mammoth Cave," by Rev. H. C. Hovey. The speaker placed before the section a map illustrating the cave, and showed the difficulties of constructing such a map, the chief of which was the unwillingness of the proprietors of the cave to have a correct survey published.

Mr. Hovey stated that the saltpeter derived from Mammoth Cave, was conveyed to Philadelphia by mules and in ox-carts, and was the chief source of material for gunpowder used in the war of 1812. This fact has not been stated in a single history of the United States. The author of the paper laid before the section, who extended his time, the results of temperature observations made in 1878 and corrected this month. Sixty temperature observations were taken, of half an hour each, the instruments used being the Casella and Green thermometers from the Winchester Observatory. The results obtained are: The lowest temperature in any part of the cave is 52° F.; the highest, 56° F.; the general temperature of the cave may be fixed at 53° F., which would, of course, be also the temperature of the crust of the earth in the region where the cave is located.

Professor Cox, the Vice-President of the section, congratulated Mr. Hovey, on settling this important point, which had long been in dispute among scientific men. After some remarks in reference to priority of discovery of Welcome avenue leading from Blacksnake avenue into Serpent Hall, the section adjourned.

In the section of Anthropology, the first paper read was "Worked Shells in the New England Shell Heaps," by Edward S. Morse. Mr. Morse exhibited specimens of the large winch cockle (*lunatia*), which showed unmistakable signs of having been worked. His work consisted in cutting out a portion of the outer whorl near the surface. To show that this portion could not be artificially broken he exhibited naturally-broken shells of the same species, both recent and ancient, in which the fractures were entirely unlike the worked shells.

Professor Cyrus Thomas read a paper entitled, "Comparison of Maya Dates with Those of the Christian Era."

Professor Thomas is preparing for the Bureau of Ethnology of the Smithsonian Institution an article on "The Manuscript Troano," which is described as follows:

This manuscript was found about the year 1865 at Madrid, Spain, by the Abbe Brasseur de Bourbourg while on a visit to the Library of the Royal Historical Academy, and named by him "Manuscript Troano," in honor of its possessor, Don Juan de Tro y Ortolano.

This work was reproduced in fac-simile by a chromo-lithographic process by the commission Scientifique du Mexique, under the auspices of the French Government, Brasseur de Bourbourg being the editor.

The original is written on a strip of Maguey paper about fourteen feet long and nine inches wide, the surface of which is covered with a white paint or varnish, on which the characters and figures are painted in black, red, blue and brown. It is folded fan-like into thirty-five folds, presenting, when the folds are pressed together, the appearance of an ordinary octavo volume. The hieroglyphics and figures cover both sides of the paper, comprising seventy pages, the writing and painting of the figures having been apparently executed after the paper was folded, so that the folding does not interfere with the writing.

Some progress has been made in deciphering the Maya picture-writing or hieroglyphics.

Mr. McAdams read a paper on "Stone Implements from the Drift," and exhibited several stone axes which some persons thought showed drift marks upon them. They were found in ravines, and might be referred to a period much older than that to which they really belonged. In his explorations he had found nothing which convinced him that we really have paleolithic implements in our drift deposits. The relics were examined with great interest.

In the Section of Entomology, Professor Riley read a paper on "The Egg-case of Hydrophilus triangularis," with illustrative drawings; also another on "The Oviposition of Prodoxus decipiens," a small white moth.

B. Pickman Mann read a paper on "Suggestions of Co-operation in Furthering the Study of Entomology," and Psyche in particular.

The Cincinnati meeting of the American Association for the Advancement of Science, really the American Congress of Science, was a most important one, whether we view it in reference to the numbers in attendance, the high standing of the members in their various specialties, or the bearing upon science and real life, of the subjects discussed. Considerable space has been devoted by the REVIEW to the Proceedings of this meeting, still we have found it possible to give but the barest synopsis, much important matter having necessarily been omitted. After the adjournment the members took their accustomed excursion which afforded the rest and recreation so much needed after severe professional duties.

CHEMISTRY.

GLASS AND CEMENTS.

From the proceedings of the Polytechnic Club of the American Institute, March 24th, we clip the following paper upon "Glass and Cements," by Dr. John Phin, of the *American Journal of Microscopy*, which will be of very general interest to a large proportion of our readers:

Cements are to be divided into four classes according as they dry, congeal by oxidation, harden by cooling, or "set" by other chemical changes. First are those which harden by evaporation. Under this head may be classed paste, mucilage and their varieties. Glues to a certain extent dry.

The second class includes the oils. These are said to dry, but it is not by evaporation. They lose nothing, but absorb oxygen from the air. The cement weighs more after hardening than when first applied. Cements which congeal by oxidization cannot be treated in the same way as those of the first class. They require a larger time to handle. The hardening goes on from the outside inward. For example, mend a piece of porcelain with one of these cements. Test it in a few days, and although the outside will be hard, the inside will not appear to have dried in the least, and will have no tenacity. Leave it for six months, and it will be very strong.

Thirdly, we have those cements which harden by cooling. These, instead of gaining their strength slowly, like those of class two, become hard at once. Shellac is a good example of a cement of this kind. China put together with melted shellac is extremely strong.

A fourth class of cements may be represented by plaster of Paris. This is the type of an extensive class, including the whole line of mortars and hydraulic cements, on which depend our great engineering works, and even the houses in which we live. It forms a chemical compound combination with water first, and then more slowly hardens by drying, a part of the water evaporating.

In order to use a cement successfully we must know to what class it belongs and treat it accordingly. Next, we must know how to put it on. In no case should it be used in a large quantity. The less the better is a good rule to follow.

In mortar we mingle sand, which makes the actual thickness of the lime between the stony surfaces in all cases very slight, however much mortar we may employ. In the use of glue this is not practiced or necessary. The joints made by carpenters are good examples of the minute quantity of a cement which is necessary. Place a well-made glued joint on the edge, and it is almost impossible to find the lines of glue. Its position is mainly discovered by the direction of the grain of the wood.

Intimate contact between the cement and edges is necessary. This is not easy, on account of the layer of air which adheres to all bodies. This layer of air is what causes needles to float when carefully placed upon the surface of water. When an object is warmed the film of air is easily moved, the hot needle sinks, and to the hot body the cement will adhere easily. It is faulty for this reason, that in gluing it is needful to have the work warmed. The rubbing of the surfaces together gets rid of the air, and then not only with glue, but with all cements, the surfaces must be pressed closely together.

Common glue has most enormous strength and adhesive powers if it is good. But to be good it must not have been injured in the making by decomposition, to which the material and the glue itself are peculiarly subject. Here the lecturer detailed at some length the process of glue-making, and said that if glue was not pleasant to both taste and smell, it would not be strong. If not offensive, it could be trusted to hold wood more strongly than its own fibers.

The strongest known glue is that made from the skins and sounds of fishes, and the strongest of this class is made in Lapland, from the skin of a perch. The Laplanders use it in making their bows, which are both strong and durable. In making it their cold climate is greatly in their favor; here a fish skin will begin to undergo decomposition before it can be dried.

In making it the skins are put into a bladder, which answers for a water bath, and heated in water until a sort of glue results. This glue is, as may be imagined, very elastic. Isinglass is a very strong glue, made from skins, sounds, etc., of fishes; it is very liable to be spoiled in making by overheating.

BOOK NOTICES.

THE STATE AND HIGHER EDUCATION. An address before the Minnesota Academy of Natural Sciences, by Prof. N. H. Winchell.

The address takes the ground that the State "should not only take measures to qualify her citizens to read their ballots, but to discharge all the duties of high citizenship."

FIRST ANNUAL REPORT OF THE WINCHESTER OBSERVATORY. By the astronomer in charge of the Horological and Thermometrical Bureaus, 1880–81.

This Bureau possesses the most approved instruments known to modern science, including a fine transit, for correcting chronometers, clocks, watches and thermometers. Hitherto this work has been largely done abroad, instruments being sent to Kew, and elsewhere, but the authority of the Winchester Observatory has recently been accepted as final. Fifty thermometers of physicians, taken from actual practice, have been examined during the past year, whose errors exceeded a degree and a half. The report states that "there have been, comparatively, but few physicians' thermometers made in this country which have united accurate graduation of the scale with the requisite age of tube, necessary to preclude further sensible changes, and there is little doubt that the great majority of physicians' thermometers now in use in the United States are from one-half to two degrees high in their indications.

PAPERS OF THE ARCHÆOLOGICAL INSTITUTE OF AMERICA. (American Series.) By A. F. Brandelier.

This volume contains two papers: 1. Historical Introduction to Studies among the Sedentary Indians of New Mexico. 2. Report on the Ruins of the Pueblo or Pecos.

THE 12TH AND 13TH ANNUAL REPORTS OF THE PEABODY MUSEUM OF AMERICAN ARCHÆOLOGY AND ETHNOLOGY, at Cambridge, Mass., are now in press.

These volumes will contain several valuable essays on subjects connected with American Archæology. Of these essays the one by Mr. Schumacher on "The Method of Making Pottery and Baskets by the Indians of Southern California," and another by Hon. Lewis H. Morgan, "Description of an Ancient Stone Pueblo on the Animas River, New Mexico," will be of special interest to those engaged in the study of the beginnings of the arts among the aborigines of America.

ARTISTS OF THE NINETEENTH CENTURY AND THEIR WORKS. By Clara Erskine Clement and Laurence Hutton, is a hand-book of biographical sketches of American and European artists of the present century, numbering in all 2,050 names.

This work is really, as it is described, "a perfect cyclopædia of information concerning the lives, styles, schools, and works" of artists of the period it purports to cover. "Including so many subjects," says the prospectus, "it cannot within the limits of two volumes discuss artists and schools of Art exhaustively;

indeed, such discussion is not the object of the work, but to embrace in convenient compass such personal, characteristic, and artistic facts regarding artists of the century as will make the work indispensable for reference, and a great convenience for artists and Art-lovers and students. Critical estimates from competent authorities, and full indexes, add largely to the value and practical utility of the work." Such examination of the work as we have been enabled to give it assures us that the task undertaken by Mrs. Clement and Mr. Hutton has been performed with great care, diligence, and success. The publishers are Houghton, Osgood & Co., of Boston.

KANSAS HISTORICAL COLLECTIONS. Vols. 1 and 2, 1875–80; by F. G. Adams, Secretary. Published by the Kansas State Historical Society, Topeka, Kan.

This volume is made up of the first and second biennial reports, together with a statement of the collections of the Society, from its organization in 1875, to January, 1881. An inspection of the copious indices of this volume shows what a vast amount of material of the early history of Kansas, Judge Adams has gathered up in a reliable form and preserved for the future historian of this State. Judge Adams seems to possess the necessary requisites for the secretaryship of such a society, and in the present volume he has given full proof of his mission. No State possesses a more thrilling, early history than Kansas, and no State has done more to render that history accessible to the world through its Historical Society.

THE SCHOOL OF LIFE. By W. R. Alger, 16 mo., pp. 205. Roberts Brothers, Boston, 1881. For sale by Kansas Book and News Company.

This volume is foreshadowed in the following passage from the introduction: "The earth has frequently been called a vale of tears, trodden by mourners; a desert threaded with caravans of pilgrims; a bower of pleasure, inhabited by careless flutterers; a gloomy prison, occupied by convicts on probation; a tent, in which immortal travelers encamp for a night; a ship sailing around the zodiac, the generations, its successive crews; a temple dedicated to worship, the human race its natural priesthood; and so on, with scarcely an end. But, on the whole, no other comparison of it is so satisfactory as that which likens it to a school, and describes the business of its occupants as the pursuit of an education fitting them to graduate into the invisible university of God." Likening the world to a school the author goes on to treat of the rooms of the school, the founder, the providential, general and special teachers, and the various lessons learned. The book contains the same characteristics as former volumes, by the same author, such as "The Genius of Solitude," and "The Friendships of Women." Many rich passages are in store for the reader and many sweet thoughts find an echo in the heart, and as one rises from the perusal of the book he resolves to have a

larger faith in the possibilities of life, to put forth more energy in preparation for that which lies beyond and to be more resigned to the inevitable—the limitations of our being. One must regret, however, that so sweet a writer as Mr. Alger should allow the divine benevolence to overshadow the other attributes of the Divine Being. The book will doubtless have a large sale.

How to Tell the Parts of Speech. By Rev. Edwin A. Abbott, D. D., 16 mo. pp. 143. Roberts Brothers, Boston, 1881. For sale by Kansas Book and News Company.

In this hand-book the author attempts to eliminate the vernacular from the Latin nomenclature which grammarians have fastened upon it. The inflections of the Latin language have no correspondence in the uninflected English, and it is impossible to find English things for Latin names. English words must be classified according to their *functions* in the sentence. Taking this as a key to unlock the mysteries of English grammar, the author thinks that a very young child may be taught almost without knowing it, the various parts of speech. Some intelligent teachers have already pursued this plan with success, and this hand-book may be made very valuable to teachers. The English language unfolds more easily under natural methods.

EDITORIAL NOTES.

The Cincinnati meeting of the American Association began on the 17th of August, and in spite of the prospect of hot weather, attracted the largest attendance of any meeting in the history of the Association, except that of last year at Boston. Many of the leading scientific men from all parts of the country were present and papers of much interest and value were read in the various sections. We have given a very full synopsis of the Proceedings of the Association in this number of the Review, and we hope in future numbers to publish some papers in full which seem more immediately to demand attention as contributions to science. The members of the local committee were indefatigable in their efforts to make everything move on smoothly and happily, and the hospitality of Cincinnati was boundless. The proposed changes in the constitution were effected by which the number of sub-sections was increased, and some other alterations made which it is believed will add to the value of future meetings. The meeting of next year will be at Montreal. Excursions to Madisonville, Chattanooga and Mammoth Cave were organized and a large number of the Association enjoyed these trips, where science and pleasure seeking are so pleasantly combined.

WE see by the *American Art Review* that M. Bastien Lepage's Joan of Arc, which was pronounced one of the masterpieces of the last *salon*, has been bought for a gentleman of New York City, by Mr. J. Alden Weir, the artist who visited Paris during the summer. Hans Markart's last picture Diana and her Nymphs, a work of very large dimensions, is also said to have passed into the possession of an American collector.

PROF. SNOW, of the University, had a narrow escape from the Apaches. His party were obliged to leave their baggage, and passed the wagons of the party that were slain, seeing their blood hardly dried. Hundreds of friends will rejoice at his escape.—*Kansas Telephone.*

WE recently spent a day with Dr. I. D. Heath, of Wyandotte, and found, among his collections, specimens of the woods of Wyandotte county, which are in preparation for the Bismarck Fair. The following woods were noted: Burr Oak, Hackberry, Locust, Linden, White Oak, Slippery Elm, Wild Plum, Shell Bark Hickory, Sumach, Mulberry, Black Walnut, Dogwood, Wild Cherry, White Ash, Grape Vine, Black Jack, Red Bud, Black Oak, Papaw, Prickly Ash, White Elm, Water Willow, Water Oak, Pig Nut Hickory, Iron Wood, Chinquapin Oak, Red Thorn, Box Elder, Coffee Bean, Sycamore, Water Beech, Pecan, Soft Maple, Crab Apple, Elder, Buck Eye and Cottonwood. The woods for exhibition will be sawed into sections six inches in length, and the sections according to the size of the tree, halved or quartered. Half of the pieces will be polished and treated with shellac, the other half alternately left so that the grain of the wood may be seen.

THE recent meeting of the American Pharmaceutical Association was an *event* in the history of Kansas City, and we made arrangements to publish a *resumé* of the proceedings. But as the report was somewhat delayed we have deferred its publication until the next number of the REVIEW.

IT affords us pleasure to call attention to Spalding's Commercial College. It has been in continuous and successful operation for sixteen years, and offers unsurpassed facilities for instruction in English and Commercial branches, having an able faculty of experienced teachers and lecturers. Over three thousand students have been in attendance since its organization, hundreds of whom are now filling high positions of profit and trust as bankers and business men in different parts of the country. The writer has known Mr. Spalding since he was a student in the University of Michigan, extending over a period of thirty years, and, therefore, speaks from personal knowledge. In private life he is irreproachable, in his profession he is one of the most indefatigable workers, as a penman he almost equals Mr. Spencer himself, and as a pen-artist he excels him, as a teacher of commercial branches he trains his students into the most careful business habits, and inspires them with a high and noble ideal of their calling, as a friend to indigent students struggling to secure an education, he will be remembered with gratitude by many a business man, and as an author he will soon be known as having published some of the best books in his department. The College was never as successful as during the present year, and the founder of such an institution deserves success.

ITEMS FROM PERIODICALS.

A new magazine, especially designed to represent South Kensington, will very shortly appear, and deal with matters of science and art. The editor says the *Athenæum* is an archæologist and quondam collector.

Van Nostrand's Engineering Magazine for August has a good table of contents. This journal has made itself a necessity to those working in its line of thought.

THE *Journal of the Franklin Institute* for August has an important article in regard to the "wearing capacity of steel rails in relation to their chemical composition and physical properties." The number contains valuable information in its department.

Harper's Monthly for September contains the following articles: The Little Kings and Queens—a poem; The English at the Sea-side; To-morrow at Ten; A Newport Idyl; Summering Among the Thousand Isles; The Widow Lee's Son, Will—a poem; The Girl's Sketching Camp; An Old Fort and What Came of It; On Star Island—a poem; The Framing and Hanging of Pictures; An Artist's Reminiscences—II Adoniram Algeroy; Wheat Fields in the Northwest; At Deacon Twombly's—a story; The German Empire; The Chances of War, and How it Was Missed; The Chamber of Silence—a poem; A Laodicean. The number is fully up to the standard. "Summering Among the Thousand Isles" reads like a fairy tale, and might be called a prose poem. Lotos Land is the American Elysium for summer tourists. "The Chamber of Silence" finds an echo in the heart. "An Old Fort and What Came of It" will be read with a deep interest as being the unfolding historical germ of William's College where Mark Hopkins has enriched the world by a life devoted to the highest interests of man.

THE contents of the *Atlantic Monthly* for September are as follows: Dr. Breen's Practice; Kashchie the Deathless, or the Diffusion of Fairy Tales; Harvest Noon; Housekeeping Hereafter; The Portrait of a Lady; Post Prandial; The Katrina Saga; The Future of Harvard Divinity School; The Dramas of the Elder Dumas; The Attempt on the President's Life; Mr. Howell's New Book; The Rise and Fall of the Confederate Government; Some Recent Biographies; The English Colonies in America; Transcendental Physics; The Contributor's Club. One can always afford to buy the *Atlantic* and take his chances. The present number is thoughtful. We learn that Harvard's Divinity School will "aim at retaining a positively Christian, while it avoids a specifically denominational character." The review of Mr. Howell's New Book will attract attention.

THE *North American Review* for September has the following articles: The Church, the State and the School; Natural Ethics; The Monroe Declaration; Shall Church Property be Taxed? Jewish Ostracism in America; The Decay of New England Thought; Ghost-Seeing and Factitious History. The leading article by W. F. Harris, finds five provinces which include all human education, viz: The Family, the School, Civil Society, the State and the Church. Each one has its distinctive work, the article relegating our ethical training to the church. The article is clear and forcible, and will be widely read.

THE *American Journal of Science* for August contains twelve papers with a large amount of scientific intelligence. The papers of this standard journal are based on original observation and experiment and it is refreshing in reading it to come face to face with Nature. This journal for many years has done honor to American science.

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